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TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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APPLIED HYGIENE IN THE TROPICS.

By Colonel W. G. King, C.I.E., I.M.S. (Retired).

REPORTS.

The Uganda Protectorate, 1915.

The Annual Medical and Sanitary Report for the Uganda Protectorate for 1915 (Dr. A. D. P. Hodges, C.M.G., Principal Medical Officer) records a decrease of blackwater fever cases as compared with 1914; there being a total of 65 cases against 82 in the previous year. The mortality rate was 27·7 per cent. as against 25·6 per cent. in 1914. Forty-two of the total cases were included in Returns from Government Hospitals and Dispensaries. Fourteen were returned from the Church Missionary Society's Hospital, Namirembe. One case occurred among Soudanese troops at Kitgum, and 8 amongst the troops on active service.

Amongst European officials, the total cases treated for all causes was 599; of these 126 were due to malaria, 3 to blackwater fever, 5 to enteric fever, 35 to disease of the respiratory system and 61 to injuries. There were no deaths during the year.

In regard to sanitary progress Dr. C. J. Baker, the Medical Sanitary Officer, points out that war conditions prevent funds being available for more than correct maintenance of improvements already executed. The usual petty anti-malarial measures have been conducted in townships, so as to "secure a reduction of minor mosquito breeding places. The areas cleared and planted with short grass have been kept in order, and in some places extended." The drainage of swamps at Entebbe, Masindi, Hoima, Fort Portal, and Mbale has been maintained, "and at the last mentioned place shows exceptionally good results." New works of this nature have been begun at Lira, Gulu, Kitgum, and Soroti. Increased areas of the Nakivubo swamp at Kampala have been drained, cleared and planted. Quinine prophylaxis has been largely practised, and mosquito-screened quarters for officials have been increased.

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This is a programme that many tropical areas fail to equal even when funds are not liable to diversion for war purposes; so that Uganda has not lost its sense of proportion under new conditions.

A table is furnished [p. 7] showing that, between 1905 and 1915, deaths from sleeping sickness have decreased from 8,003 to 352, which must be regarded as an excellent approach to definite extinction of this disease.

In the Eastern Province an epidemic of small-pox prevailed. To protect the troops on the southern frontier, the special precaution was taken of closing all roads crossing the Katonga River, except for persons holding special passes. "All passengers on lake steamers and all troops and military porters were vaccinated." The details of this arrangement were supervised by Dr. COLLYNS. Their success was shown by the fact that "no case of small-pox occurred amongst the troops at the front."

The following table shows the results of glycerine-vaccine made locally (Nairobi) and dry vaccine and lanolin-vaccine made at the Lister Institute, London, respectively:—

Lymph.	Successful.	Modified.	Failed.	Unknown.	Totals.	No. of known results.	Percentage of successful plus modified.
Nairobi Glycer.	12,140	3,167	2,900	77,827	96,034	18,207	84·07
Lister Dry	795	126	158	1,313	2,382	1,079	85·35
Lister Lanol.	605	98	109	490	1,302	812	86·57
Arm to Arm.	6,387	358	1,112	21,114	28,971	7,857	85·84
Total	19,927	3,749	4,279	100,744	128,689	27,955	84·73

In the Bukeddi, Teso and Lango Districts, 3,478 deaths from plague occurred as against 3,238 deaths in 1914. A new endemic centre has been discovered in the Bugishu Hills. Not much space has been afforded to description of measures for prevention of spread of the disease, but it is gathered that native Inspectors are employed on reporting and isolating cases and hut burning. General inoculation with Haffkine's vaccine was conducted in the Kuman District of Lango. Beyond a few hundred cases performed in Mbale and Soroti, inoculations were "confined to military porters on leaving the endemic area."

BAHIA.

The annual report* of the Director General of the Sanitary Service of the City of Bahia, Dr. Moniz, shows that a very considerable fall has occurred of recent years in the number of cases of infectious diseases notified, as shown in the following table :—

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* MONIZ (Gonçalo). O Estado Sanitario da Bahia (Capital).—*Gaz. Med. Bahia.* 1916. Aug. Vol. 48. No. 2. pp. 4–9. Summarised by Dr. J. B. NIAS

	No. of cases notified.				
	Yellow fever.	Plague.	Smallpox.	Diphtheria.	Dysentery.
Jan.-June 1913	59	76	7	9	150
„ 1914	106	33	8	8	50
„ 1915	6	19	0	2	14
„ 1916	0	6	0	0	14

On the other hand, in tuberculosis and malaria there was no material reduction, the numbers being as follows :—

	Tuberculosis.	Malaria.
Jan.-June, 1913	395	153
„ 1914	415	257
„ 1915	423	150
„ 1916	420	160

Deaths from influenza were as follows :—For the year 1913, 6 ; 1914, 11 ; 1915, 7 ; 1916, 18 ; and the gross mortality from infectious diseases was, first half of 1913, 2,795 deaths ; ditto, 1914, 3,011 ; ditto 1915, 2,462 ; ditto, 1916, 2,308. The population of Bahia is not given.

MANSONIA TITILLANS.

According to the Annual Report of the Department of Health, Panama Canal for 1916 [p. 20] this mosquito " greatly outnumbers any other species of mosquitoes found in the Canal Zone." It has habits which enable it to escape both in the larval and pupal stage all larvicidal efforts, as these stages of existence are passed below the surface of water. This is rendered possible by the breathing tubes being adapted for piercing the rootlets of the *Pistia stratiotes* and thus obtaining their supply of oxygen. This plant multiplies by seed and by runners. In the presence of strong winds the plants are driven together so as to form large masses. The roots

> " are sometimes several feet in length and hang straight downward in the water. . . . It is in this mass of filamentous rootlets that the larvae and pupae of *Mansonia titillans* are attached. . . . The adult mosquito of this species was abundant in the Canal Zone, but the larval and pupal forms had never been found here before. . . . Thousands of these plants may be examined without revealing any larvae, as certain other conditions are also necessary for a favorable breeding place, such as shade, protection from winds and currents, etc."

DISEASE PREVENTION.

MALARIA.

Malaria in the Panama Canal Zone.

When public bodies are pressed to undertake antimalarial measures, the man of finance finds a ready weapon to defend the money bags in the query as to whether the theoretical sanitarian desires to inflict upon the little State of Kaffirburg the rates of expenditure of the United States of America upon the Panama Canal. In support of the hopelessness of such an effort, the local newspaper will proceed to show that if the total population of the canal area was debited with the U.S.A. rate of expenditure on sanitation, it would amount to a heavy sum per head of the population. The theorist is then desired to contemplate the absurdity of an agricultural labouring population, largely paid in kind, affording such a sum. This suggestion ignores the fact that in speaking of payment per head of a population (if sums be raised by equitable taxation) the incidence is proportional to the monetary resources of individuals, and that, unless it be by indirect taxation, the labourer's wages may not be affected at all. The suggestion also ignores the increased prosperity of a community and better fitness to meet taxation, which should follow abolition of an important labour disability. By neglecting such limitations sums approaching "Victory loans" in amount have been assumed as necessary in certain lay newspapers in the tropics; and their correctness is vouched for by reference to *lump* expenditure on Panama measures. There thus occurs failure to distinguish between curative and preventive measures, or to take note of the peculiarities of the methods of budget allotment. GORGAS, in his address as President of the American Society of Tropical Medicine, at the St. Louis Meeting of June 11th, 1910, declared that the actual sanitary expenditure for employees and their families did not exceed 9 mils per day. Taking the dollar as 4*s.* 1·32*d.* and the rupee at 1/4, 9 mils would represent about 5·3p.* per day.

But "Victory loan" calculations, of the nature referred to, take no cognizance of the fact that the work in the Panama Canal was in the aggregate not comparable to that requisite in dealing with a single town or village. Not only was a forty mile strip of country involved but the population was subject to movement, and, above all, the conditions of soil and water, upon which mosquito breeding facilities depended, were ever fluctuating in localities following the changing nature of the engineering operations; whereas, in dealing with a large proportion of inhabited localities in the tropics, the area to be dealt with need only be such as would render impossible the flight of the mosquito from the nearest unremoved pools.

The factor of changing conditions which demanded special measures (and therefore expenditure in excess of necessity for permanent works) in the Canal is, *pari passu* with progress towards inhabited areas being more defined, becoming less evident. The importance, both as to health results and expenditure, of contrasting the two conditions is well borne out by the following extracts from pages 544–551 of the Annual Report of the Governor of the Panama Canal, for the Fiscal Year ended June 30th, 1916:—

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* One rupee = 192 pie.

"The experience of the past years has demonstrated that extensive work must be constantly maintained in and around residence districts to protect employees from malaria, and it is found that in the districts at the north end of the canal where the *Anopheles albimanus* mosquito is the one most commonly found, the work thus far done has controlled the development of malaria only in a limited degree, though the number of cases reported is continually decreasing. On the other hand, the districts south of Gamboa have relatively few malaria-bearing mosquitoes and are consequently comparatively free from malaria. The decrease in the number of admissions of employees to sick report for malaria on the Zone, exclusive of the terminal cities, is shown by the following figures:

	1913–14.	1914–15.	1915–16.
Actual admissions	2,832	1,042	547
Rate per 1,000 employees ..	108·71	77·67	56·79

"The transition from the period of canal construction to that of canal operation is being accomplished gradually and results in greater permanency in locations in which employees work and have their homes, which in turn makes it possible for this division to install much work of a permanent character, which was impossible during the construction period, and which serves the double purpose of eliminating depressions which hold water and of preparing the area for grass cutting by the mowing machines, thereby greatly reducing the expense of maintenance. This work can be advantageously pushed until ample facilities are provided to take care of the surface water in and about our residence districts, so that these areas will be practically free from stagnant water or water containing vegetable growths which favor the development of mosquitoes. It is roughly estimated that about one-third of the work of this nature which the districts require was accomplished during the past year, and plans have been made for the continuance of the work during the coming year. . . . Until maintenance work is reduced by the installation of the permanent drainage measures referred to above or the area to be cared for is decreased, reduction of the force of inspectors on Zone sanitation can not be consistently made."

Malaria no longer reigns supreme in Panama. It occupies only the second place in mortality—venereal diseases being now the leading cause, according to the Annual Report of the Health Department, Panama Canal, for 1916. The malaria hospital admissions rate in 1916 was 16·49 as against 31·20 for 1915 or a reduction of 86 per cent. There were only two deaths from this cause among employees—both of whom were negroes. The death rate under this head was 0·59 per 1,000 employees, as compared with 1·19 in 1915. The Report states:—

"With the completion of the permanent sanitary work now in progress, it is believed that malaria will be practically eradicated from our sanitated districts and the terminal cities, if the present standard of maintenance work is continued. Cases of the disease may be expected to occur now and then among laborers working in outlying districts in which anti-mosquito work is not carried on, as with clearing gangs, mapping parties, etc., unless rigid individual precautions are taken."

Malaria in jungle travel.

In the pre-Ross period of malaria doctrines, travelling in certain jungles was considered especially risky. In the present day, the careful man no longer blames unexplored jungle but selects malaria-free servants, or duly attempts the slaughter of parasites borne by them by judicious quinine administration, before the journey is undertaken. The Report of the Department of Health of the Panama Canal for the month of December, 1916, refers to the subject as follows :

> "With the cessation of the rains, large forces of men have been quartered by the supply department in camps outside of the sanitated districts, for clearing land for pastures. These camps are some of them necessarily in areas in which malaria bearing mosquitoes are abundant, and many of the men are careless regarding anti-malarial precautions. The non-effective rate in these camps from malaria will be in proportion to the lack of intelligent cooperation on the part of foremen in enforcing anti-malarial measures, and the use of mosquito bars particularly. The surveying parties engaged for the past 18 months in marking the 100-foot contour line around Gatun Lake and its tributaries, have demonstrated conclusively that men can travel and camp in the jungle with small risk of malarial infection, if ordinary anti-malarial precautions are taken. Malaria, even under these conditions, must be regarded as a preventable disease."

The Commissioner of Public Health (Dr. J. I. MOORE), Queensland, in his Annual Report for 1916, states that in view of the recent annexation of German New Guinea where malaria is endemic, it has been thought expedient to proclaim malarial fevers "infectious diseases," "as troops returning from that area were likely to spread the disease through the agency of mosquitoes. Soldiers who have returned have been placed under treatment, and are detained at least for two months in order that their blood may be carefully tested for micro-organisms." The Commissioner has advised measures against anopheles, which are now supported by special Regulations. He points out that "the Northern Coastal areas of the State whose situations are within the tropical Zone, where malaria has its home, are the centres to be viewed with suspicion, and require more stringent measures to be adopted than on any other portion of Queensland." Dr. Moore evidently believes in what he practises, "Prevention is better than cure."

Malarial foci.

At page 5 of the Straits Settlement Medical Report for 1914, the importance of securing a history of the place of origin of malarial fever in sufferers, and thus ascertaining and inhibiting anopheles breeding facilities, is impressed upon the reader.

In the Report of the Governor of the Panama Canal for 1916 [p. 555], the usefulness of this method is also testified to :—

> "The plan of following up reports of cases of malaria by an investigation either by the health officer or a sanitary inspector, which was inaugurated this year, has produced admirable results in helping to localize responsibility."

Anti-malaria measures in Cyprus.

In 1913, efforts against malaria in Cyprus underwent rejuvenation, after the deputation to that area of Sir Ronald Ross. In his Annual Medical Report for 1915* the Chief Medical Officer (Dr. CLEVELAND) shows that in the brief space which has elapsed there has resulted

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* Cyprus. Annual Medical Report for the Year ending 31st December, 1915. 1916. Nicosia. Printed at the Government Printing Office. pp. 9 & 10.

> "approximately a fall of 50 per cent. in both the malarial incidence and in the spleen rate. . . . The reduction is fairly evenly distributed over the Island, and with a few exceptions all the returns are lower than in previous years. The greatest reduction is shown in the Larnaca and Famagusta Districts, which were also the most malarial, and this is due in great measure to the extensive drainage works that have been carried out. A marked reduction of mosquitoes was observed at Famagusta as a result of draining and pumping operations undertaken at the Fresh Water Lake near the towns of Famagusta and Varosha."

During the year the following works were executed:—Drains and streams cleared 264,471 feet; new drains (large and small) 93,946 feet; 329 pools filled in, which had a total capacity of 930 c. ft.; 227 lineal feet tunnels were repaired, and 498 wells were treated by filling in, were screened, or were supplied with fish, as seemed suitable in each case.

If local authorities in Cyprus persevere in these anti-malarial works, they are likely to render Cyprus a favourite health resort. Even as matters stand— always granted that registration is correctly conducted —the rate of natural increase for Cyprus is 12·5 per mille, which contrasts favourably with results for the United Kingdom. On the necessity for perseverance, Dr. Cleveland makes the following remarks:—

> "The results so far attained must, I think, be regarded as satisfactory, but I venture to add a word of warning lest the impression may be formed that in the next few years malaria will have disappeared from the Island. Such a fortunate result is only obtainable under the most favourable conditions, but the reduction may continue if the work now commenced is carried on with the utmost vigour. It is in the larger towns of the island that the chief difficulties of the future will be experienced. A stage in malaria reduction will probably be reached where the figures remain practically stationary. Further reduction may then be a matter of great difficulty, and will depend on the means that are adopted to prevent mosquito breeding in wells and cesspits."

PLAGUE.

Plague in the Punjab.

According to the Sanitary Commissioner, Punjab, in his Report for 1915, the mortality from plague was worse in that year than during the preceding eight years except in 1907, when there were 666,501 deaths from this cause. The measures for prevention included, (1) the circulation of a pamphlet on prevention and treatment of plague—being an appeal by Lady O'Dwyer to the women of the Punjab; (2) the employment of disinfection (*a*) by solar heat; (*b*) "Desiccation by means of dried cow-dung cakes and *neem* leaves burned on the floors is in use, and people like it;" (3) Rat destruction by means of trapping, baiting, smoking with cow-dung cakes combined with *neem* leaves and chlorate of potash, smoking with stoves.

> "The general idea has been to reduce the rat population in—
> "(*a*) places which were infected late in the preceding year.
> "(*b*) places where the epidemic generally appears early and annually.
> "(*c*) places which reported unusual rat mortality or human cases at any time.
>
> "The good effects of these operations were well illustrated by the work of the municipalities of Rawalpindi and Lahore. In the former case operations were commenced very late, but the result was satisfactory in that the disease was kept well in check. In Lahore over 2 lakhs of rats were killed.

"Owing to Chlorate of Potassium for Nim Battis not being obtainable in the market, smoking with Bhusa and sulphur was carried out by means of stoves with a bellows attachment with a very good result.

"*Cresol Fumigation.*—This was done fairly extensively and its utility seemingly succeeded in aborting outbreaks or in preventing their getting out of control.

"*Evacuation.*—This measure the people know to be effectual, but it is difficult to get them to practice it so as to be of real use in cutting short an outbreak. During active infection people will fly away in panic, evacuating houses and even whole Mohallas, but with the exception of rare instances where all possible help has been given by the District authorities, they will not evacuate whole villages. The unintelligent employment of this measure together with the little use made of their power to refuse access to people from infected places are largely responsible for the spread of the disease from one place to another.

"*Inoculation.*—Although it must be admitted that there are certain districts where this measure is becoming to be appreciated at its proper value there is no doubt that there is little willingness shown in accepting it except where the danger of contracting the disease is imminent. Consequently we have been practising limited inoculation, i.e., inoculating mainly of persons actually exposed to infection. This has been found to work very satisfactorily and we have this year done as many as 161,313 inoculations in British districts, with another 4,844 in the Native States, as compared with 49,468 in 1914, and 26,419 in 1913, and 51,570 in 1912."*

Plague in Colombo.

Dr. PHILIP (M. O. H., Colombo) and Dr. HIRST (Bacteriologist, City of Colombo) have written a paper for the *Journal of Hygiene*† which should prove of much interest to epidemiologists. The paper opens with the statement that it was not till 18 years after the spread of the plague epidemic in India that Ceylon succumbed. They point out that there was some disinclination of the public to believe that plague had really invaded Ceylon; as they had before them the "example of the failure of the disease to thrive in such places as Madras, Singapore, and other maritime towns within the tropical belt." The epidemic was ushered in by "19 sudden deaths, all of which were proved by bacteriological examination to be due to septicaemic plague. The exception, which was the fourteenth in order of occurrence, developed an auxillary bubo, the patient being a hospital cooly" inoculated when assisting at a post mortem examination on a septicaemic case. They then summarize the important features of the epidemic:—

"(*a*) The percentage incidence, both among human beings and rats, is low except amongst the rats at the commencement of the epizootic, yet the virulence of the infection is very great.

"(*b*) The clinical signs in the human subject are often very obscure

"(*c*) There is frequently a remarkable absence of distinctive post-mortem signs, not only in the human subject, but in both naturally and artificially infected rodents.

"(*d*) The septicaemic type of infection prevails over the bubonic among naturally infected *Epimys rufescens*, the Colombo house rat, as it does in the human subject.

"(*e*) The usual method of estimating the incidence of plague among rats by a study of their port-mortem appearances, which has proved so successful in Northern India, would for this epizootic fail to detect a large proportion of the most heavily infected rats.

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* Report on the Sanitary Administration of the Punjab and Proceedings of the Sanitary Board for the Year 1915. 1916. Lahore: Printed by the Superintendent, Government Printing. p. 12.

† *Journal of Hygiene.* 1917. Feb. Vol. 15. No. 4. pp. 527–564.

"(*f*) The usual signs of the presence of an epizootic among rats have been conspicuous by their absence both before and since the appearance of plague.

"(*g*) The predominant rat flea is a different species from that occurring on rats in most plague infected localities.

"(*h*) There is experimental evidence that the Ceylon strain of plague is peculiar in some respects.

"(*i*) Plague as it appeared in Colombo is a disease which might easily escape detection for long periods in localities where an efficient system of inquiry into the cause of deaths is not in operation.

"(*j*) The incidence of the human plague has been almost entirely confined to certain insanitary districts of the city."

The source of infection was not traced, but was *assumed* to be by rats received with grain from Negapatam, Madras Presidency. In the septicaemic form of plague, the authors state, death is usually sudden, and is preceded by no very marked symptoms beyond high fever with "great oppression in the chest." In no case of septicaemic plague "was it possible to detect by palpation any enlargement or tenderness of the glands. This is in marked contrast to the bubonic cases where even the slightest degree of perceptible enlargement is, as a rule, attended with great tenderness and pain." Not only was the septicaemic type of plague predominant in infected human cases, but also in rats. Thus, in 1914, of the infected *Epimys rattus* 45·08 and, in 1915, 60·6 per cent. suffered from this form of plague; whilst the *Epimys norvegicus* suffered similarly to the extent of 20·75 per cent. in 1914, and 30 per cent. in 1915.

The authors, on account of the extent to which the rats presented the septicaemic type of the disease, found it undesirable to rely upon the macroscopic appearances for diagnosis of plague, and they state, "a large proportion of the septicaemic rats in the Colombo epizootic appear almost normal to the naked eye, and are accordingly not detected in the preliminary macroscopic examination."

The authors note that the fleas in Colombo rarely attack persons entering plague infected houses after the removal of the patient, and assert that the predominant rat-flea is, as identified by ROTHSCHILD, *Xenopsylla astia.* It is important to note that according to ROTHSCHILD these are found in Rangoon, and that rat fleas obtained from the Madras City were all of this variety.

The authors conclude their paper by making the following statement:—

> "In view of the exceptionally high degree of septicaemia in many of our cases of human plague, the question of the possibility of the transmission of the infection from man to man through the agency of human ecto-parasites such as *Pulex hominis, Cimex rotundatus* or *Pediculus corporis* becomes of practical importance and especially in view of the work of Nicolle and his collaborators. We are not yet, however, in a position to record any fresh data bearing on this matter."

Remarks.- The demand by the authors for further investigation of methods of conveying plague is certainly to the point. A study of the valuable work of the Indian Plague Investigation Commission in Bombay will show when war conditions no longer absorb so largely the medical profession in India, that there still remain minor plague factors which deserve more extended study than the time formerly at their disposal permitted. Amongst other items, certainly, the place in epidemiology of septicaemic and the pneumonic forms of plague, in rats as well as in humans, and the rôle of other insects than the flea, will doubtless receive more attention than it has been hitherto possible to accord.

The authors' reference to Madras and Rangoon as maritime localities where plague does not thrive must be accepted in a comparative sense. Rangoon (as was the case with Colombo) was long spared; but as it has not been free for a single year since 1905, there can be no doubt of the power of plague to maintain its hold in that locality. From 1911 to 1915, the plague deaths in municipal limits have amounted to 5,678. As to the City of Madras, in 1905–06 plague made an excellent struggle to survive the prompt sanitary efforts of the municipal staff, and exhibited tenacity enough to carry over one season. In the small area attacked 102 indigenous cases occurred; and Colombo, notwithstanding its maritime position, and its unfavourable temperature in certain months, is not free of plague up to date.

The authors draw special attention to the predominance of the septicaemic type of plague in Colombo. It would not however be necessary to assume that this form is peculiar to maritime localities. Rather would it seem, in the writer's experience, that the septicaemic is a fairly frequent form in which first attacks in inland districts occur; although there is absence of the persistence of this type (as in the case of Colombo) after the disease has established itself. For example, in the 102 indigenous cases in the City of Madras 16·6 per cent. had no bubo; of the imported cases also up to 1913, 44 per cent. had "no bubo." In Vaniambadi on its first attack, it was not till 14 cases had occurred (in Colombo, 19 cases) that a single bubo was found. In Arcot in 1899, "no bubo" cases formed 29 per cent. Such instances could be multiplied.

The authors' remarks as to the rôle of the *Xenopsylla astia*, as contrasted with the familiar *Xenopsylla cheopis*, will certainly awaken interest, and require the re-opening of some points in plague epidemiology. They found that it exhibited reluctance to bite the human being at temperatures over 80° F., and they "experienced the greatest difficulty in transmitting plague from rat to rat, under experimental conditions, through the agency of *X. astia*." The following figures from Reports supplied to the Colonial Office afford the most recent intelligence as to human and rat plague in Colombo:—

Date of Report.	Human Plague.	Rats examined.	Rats infected.
11 Dec., 1916.	8	341	2
16 " "	7	393	0
29 " "	8	?	1
31 " "	6	?	0
8 Jan., 1917.	2	236	1
15 " "	7	396	2
22 " "	4	644	1
27 " "	5	566	1
3 Feb., "	11	473	0
10 " "	9	559	3
17 " "	14	680	7
24 " "	11	462	6

Diagnosis of Rat Plague.

In their paper on plague in Colombo*, Drs. PHILIP and HIRST call attention to the insufficiency of data furnished by the macroscopical method when dealing with the septicaemic form of plague in rats. Similarly, caution is advised by Passed Assistant Surgeon C. L. WILLIAMS of the U.S. Public Health Service in trusting to the method, when attempting identification for purposes of prevention. In a paper on the subject† whilst acknowledging the value of the method, he maintains that it should be supplemented by microscopical examination of smears. He shows that in identification of rat plague in New Orleans "the smear examination resulted in the detection of seven infected rats (35 per cent.) which otherwise would have passed unnoticed. These seven cases at necropsy presented absolutely no abnormality discernible by the naked eye suggestive of plague, and this notwithstanding the fact that they were very carefully re-examined after the microscopist had reported the smears as 'suspicious.'" Finally, he states it is advisable to supplement the microscope by the macroscopic method, "placing the greater dependence on the naked eye appearance and making all possible diagnosis thereby, but nevertheless employing the microscope examination of 'smears' from tissues as a 'second line of defence.'"

Nyanza Province, East Africa Protectorate.

According to the Annual Medical Report of the East Africa Protectorate for 1915, there were during that year 33 cases of plague at Kisumu and only 1 at Nairobi. It would seem fortunate that having regard to the stream of traffic between these two points (as stated in a recent Sanitary Report for East Africa by Professor W. J. SIMPSON, C.M.G.), no more serious spread occurred. In addition it is recorded that possible cases had existed in the Districts of Maragoli, Bunyore, Sagam, and Seme. The available staff was however so insufficient that "no supervision could be exercised" in these particular areas.

As soon as plague epidemics become large, it is almost inevitable that, with limited staffs at disposal, the classification of cases of plague should be characterised by less discrimination. The following statement of the proportion of types of plague therefore, although derived from small figures (34 cases), is worth recording in view of future possibilities of extension of plague in these particular areas :—Bubonic 22, with 18 deaths ; pneumonic 3, with 3 deaths ; septicaemic 9, with 9 deaths.

At Kisumu, plague has been endemic for the last eight years. Dr. RADFORD, the Principal Sanitation Officer, insists upon the danger of this particular town to the Protectorate generally. He states :—

> "It is a terminus of the railway, the port of the Uganda Marine, and to it thousands of tons of grain and other country produce are annually brought. This, added to the fact that plague has been reported in the outlying corn producing districts of Maragoli, Bunyore, Sagam and Seme, emphasises the necessity for the adoption of speedy and thorough measures for the sanitation of the town and district, the erection of rat-proof grain stores and houses, with the installation of a fumigation plant capable of dealing with these materials in bulk.

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* *Loc. cit.*

† *Public Health Reports.* 1916. Aug. 18. Vol. 31. No. 33. p. 2199.

"The measures adopted in townships to anticipate any serious outbreak have consisted of periodical visitations by the staff, voluntary or compulsory inoculation with Haffkin's prophylactic, and a rat destruction campaign."*

Deratisation.

In the absence of a Clayton machine or cylinders of compressed sulphur dioxide, the use of the open method of burning sulphur is resorted to in dealing with rats in ships. The method, which is largely employed by Americans in treating shipping, is not without danger as to fire and possible inconvenience to the men who start the operation. In the Annual Report of the Surgeon-General of the U.S.A. Public Health Service for 1915 [p. 129] a simple method of meeting difficulties is thus described :—

"As the vast majority of the vessels are in cargo, the practice has obtained of fumigating the superstructure with sulphur dioxide, 2 pounds per 1,000 cubic feet, six hours exposure, counting from the closure of all compartments. The holds were fumigated in like manner by the pot method after the discharge of cargo at Wilmington, N.C.

"To expedite the recovery of sulphur pots from the holds, a simple device was used on one of the steamers. It appears to be thoroughly practical, free from fire risks, and readily handled. The pots are slung on a light wire rope carrier leading up to a convenient point near the hatch cover. In practice the pots are placed in the hold in the usual manner with a sling in place, and to remove them a lead rope at the hatch cover is hauled up and the pots come up one after the other without tilting or spilling their contents. Further experiments will be made and reported on later."

South America.

The following is a summary of the condition of affairs as to plague given in the Annual Report of the Governor of the Panama Canal for the Fiscal Year ended June 30, 1916 :—

"The plague situation along the west coast of South America has shown no improvement, but on the other hand seems to be growing progressively worse. Reports from time to time of cases along the Chilean coast lead us to consider Chilean ports as far south as Valparaiso as infected. The plague situation in Peru shows no changes for the better, and recently newspaper reports indicated the existence of an unusual number of cases of this disease in the vicinity of Paita. Guayaquil, Ecuador, and vicinity, report from January 1 to April 30, 1916, 545 cases of plague, with 218 deaths, while during December, 1915, 188 cases of plague were reported, with 71 deaths. The appearance of a case of plague during the month of May, at the port of Manta, Ecuador, shows an extension northward of this disease ; Manta, until the report of this case, having been declared free of plague for several years. Plague is also reported in Argentina, in ten localities ; in all probability being an extension of the disease from the west coast eastward." [p. 559].

At page 550, a statement of preventive measures is made :—

"The completion of the canal and the consequent influx of ships to our terminal ports greatly increases the opportunities for contamination of the Zone by plague-infected rats. It is well known that rat plague is endemic in many of the ports from which these ships come. This division employs men to destroy rats by all means possible and in all places but especially along water frontage. The bodies of all rats found are sent to the board of health laboratory for examination for plague infection, and thus far no plague has been found. In view of the almost inestimable value of this freedom from rat plague to the Canal Zone and in consideration of the risk of infection which increases with the number of ships handled by the canal, it is regarded as highly important that the work of rat proofing our water frontage be vigorously pushed and that old wooden construction which cannot be rendered rat proof be eliminated along the entire length of the canal."

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*East Africa Protectorate. Annual Medical Report for the Year ending 31st December, 1915. p. 35.

CHOLERA.

Cholera "Carriers."

The Sanitary Commissioner, Punjab, in his Annual Report for 1915 gives the following account of the spread of cholera* :—

"The Ghariala Fair in the Kasur Tahsil was considered to be a diffusion centre as from the cholera enquiry reports the source of infection was traced from this fair to at least 36 villages, many of which helped again in the further spread of the disease. It is a noteworthy fact that with the exception of the Kangra District the disease was not prevalent in any part of the province at that time and as far as could be ascertained it was not imported from the Kangra District or from outside the province; it may therefore be concluded that the real origin of the disease was from "Chronic carriers." It would also be interesting to note that the first few cases noticed in Algan, which was the first village infected from Ghariala on 29th March, were very similar to severe ptomaine poisoning, only those who attended the Fair being attacked. The course of the epidemic was much protracted, lasting from 29th March to nearly the end of September. . . . At Chilianwala it was reported that the people had evacuated their houses on account of plague and were living at different wells outside in temporary constructed huts. The two camps in which the first persons were attacked were side by side. They drank water from a well situated to the east of the village on the roadside and in the Muhammadan graveyards of the Sayyads which had been closed for the last four months. The water contained a lot of decomposed matter which lent it a whitish colour and an offensive smell. Next day after drinking the water 4 cases of vomiting and purging occurred in both these camps. Two of them ended fatally, while the others recovered. When the people assembled in the same graveyard to bury the first Muhammadan case and offer prayers, several of them drank water from the same well and all were seized with vomiting and purging in the evening."

Disinfection by Boiling.

The Sanitary Commissioner, Punjab, in his Report for 1915 gives the following statement of an excellent method of attempting freedom from contamination of draw wells carried out by Dr. **KHAWAGA ABDUL RAHMAN**, when acting as Additional Deputy Sanitary Commissioner :—

"Owing to heavy rains the gathering at the Pehowa fair (Karnal District) was much less than was expected, and only about 40,000 people came in from the adjacent districts and Native States. The wells in and round the fair area were disinfected with permanganate of potash, and no other persons, except special Jhewars, were allowed to draw water from the wells. The custom here is for a large number of persons to draw the sacred water themselves, but only those whose vessels and ropes had been disinfected by boiling water for which arrangements were made and passes given, were allowed to do so. The fair lasted from 12th to 15th March and owing to the excellent arrangements made no infectious or contagious diseases were introduced.†"

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* Report on the Sanitary Administration of the Punjab and Proceedings of the Sanitary Board for the Year 1915. 1916. Lahore: Printed by the Superintendent, Government Printing, Punjab. p. 8.

† *Loc. cit.* p. 19.

SMALLPOX.

Vaccine Preservation.

During 1915 the Vaccine Institute of the Egyptian Health Dept., issued 961,665 doses of preserved animal vaccine. It is stated :—

> "The adoption of cold storage for the calf lymph has greatly simplified the work of the Institute, and it is now possible to keep a large supply to meet any emergency. The lymph kept at 2° C. has been found to maintain its efficiency, and no difficulty has been experienced."*

FOOD.

Milk Standards.

In his work on "The Milk Problem in Indian Cities," Dr. L. L. JOSHI after considering the result of about 400 analyses of genuine milks from both cows and buffaloes of breeds found in the Western parts of India, has proposed the following standard† :—

> "Milk, as is ordinarily obtained in the market, shall be considered genuine if it is found to contain at least five per cent. of fat and not less than eight and a half per cent. of non-fatty solids, provided that the percentage of fat may be allowed up to three and a half, only when it is proved to the satisfaction of the court that the sample was one of unmixed cows' milk, the onus of the proof resting with the vendor"

This standard takes into account the fact that the milk supplied by vendors to the public is largely a judicious mixture of buffaloes' and cows' milk. The respective composition is thus stated :-

Proposed Milk Standard (Chemical) for Bombay and Western India.

	Fat per cent.		Non fatty solids per cent.	
	Average.	Lowest limit.	Average.	Lowest limit.
Buffaloes' Milk ..	6·5 to 8	5·5	9 to 10·0	9·0
Cows' Milk	4 to 5	3·5	8·5 to 9·0	8·5
"Mixed" Milk ..	6·0	5·0	9·0	8·5

These standards have been arrived at as a reasonable compromise of conditions found and, as the author himself contends, cannot be regarded as fit for strict adoption beyond the areas he refers to. To the sanitarian in the tropics generally, however, the composition of buffaloes' milk as found in India should be of interest.

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* Egypt, Ministry of the Interior, Department of Public Health, Annual Statistical Report for 1915. 1917. Cairo: Government Press. p. 52.

† JOSHI (Lemuel Lucas). The Milk Problem in Indian Cities with Special Reference to Bombay.—1916. Bombay: D. B. Taraporevala Sons & Co. pp. 44.

Dr Joshi quotes the average composition of 271 genuine samples as of a specific gravity of 1028·86, and containing per cent., total solids 17·11, fat 7·62 and non-fatty solids 9·57. After remarking that a bacterial standard can only be framed provisionally as an administrative and not as a legal guide, he makes the following suggestions* :—

"1. *Microbes per cc.*—The total number of microbes per cc. should not exceed two millions during the cold weather (November to March) and five millions during the hot and rainy seasons (April to October).

"2. *Lactose Fermenters.*—These should be absent in at least 1 cc. of the sample, if it is taken with strict sanitary precautions.

"(*a*) *During the cold season* (*November to March*) the sample is of—

Pure milk, if lactose fermenters are absent in	1	cc.
Good ,, ,, ,, ,,	0·1	cc.
Fair ,, ,, ,, ,,	0·01	cc.
Unsatisfactory ,, ,, present	0·01	cc.
Bad milk ,, ,, ,,	0·001	cc.
Contaminated ,, ,, ,,	0·0001	cc.
Highly contaminated ,, ,,	0·00001	cc. and less.

"(*b*) *During the hot weather and Monsoon* (*April to October*)—

Pure milk, if lactose fermenters are absent in	0·1	cc.
Good ,, ,, ,, ,,	0·01	cc.
Fair ,, ,, ,, ,,	0·001	cc.
Unsatisfactory ,, ,, present	0·001	cc.
Bad milk ,, ,, ,,	0·0001	cc.
Contaminated ,, ,,	0·00001	cc.
Highly contaminated ,, ,,	0·000001	cc. and less."

Dr. Joshi does not forget to warn his readers that the kind of bacteria is "even more important than the numbers."

In discussing subsequently the nature of bacteria found, he makes the following statement†: "As regards tuberculosis out of 741 samples of milk examined during four years, not a single sample showed the presence of tubercle bacilli."

Milk Standard in Western Australia.

This subject is very fully discussed by Mr. G. A. Greenhill, Chief Inspector, in an Appendix to the Annual Report on Medical Health, etc., for Western Australia [pp. 59–61]. He shows that, in 1911, as a result of examination of samples of milk from 2,369 cows, a Committee advised that the standard for that area be raised from 3·0 per cent. butter fat, 8·5 per cent. solids not fat, to 3·2 per cent. fats, 8·5 per cent. solids not fat. The attempt at enforcement of this new standard met with objections—reinforced by fraudulent practices. At the end of 1914, drought in the country produced high prices for food for cattle, and representations then made as to difficulty of maintaining milk at the standard of quality caused a departmental investigation, which Mr. Greenhill records. Prolonged observations on different herds of cattle produced the conclusion that :—

"An outstanding feature of the investigation was the fact, conclusively shown, that under certain conditions the mixed milk from several cows might be quite genuine and yet both fats and non-fatty solids fail to reach the standard laid down. . . .

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* *Loc. cit.*, p. 72.

† See also "Bovine Tuberculosis in India," this *Bulletin* (Sanitation No.). Vol. 6. No. 5. p. 261.

"The principal deficiency noted in the course of the above investigations then occurred in regard to the solids not fat, an experience which does not appear to have been encountered in other countries; for according to most authorities the 8·5 per cent. standard is fairly constant, though occasionally a variation is mentioned as if unimportant. . . .

"The advisory committee, therefore, feeling that possibly an honest dairyman might be prosecuted and convicted for supplying milk which did not conform to standard requirements, recommended that an 'appeal to the cow' should be allowed, whenever a defendant could satisfy the Court that such a course was in the interests of justice. This recommendation was agreed to at the latter end of the year on the following conditions:—

"(1) That if the 'appeal to the cow' should favour the defendant he must *within three months* remove the cause of the inferior milk.

"(2) That, the dairyman's *bona fides* having thus been established, he should be free from penalty on that score for that three months, but thereafter should be punishable for any continued or subsequent offence, and no further 'appeal to the cow' should be available to him.

"(3) That this 'appeal' should only be allowed in cases where non-fatty solids were concerned.

"(4) That the concession should not affect his responsibility for adulteration.

"(5) That the samples upon which the 'appeal' was to be determined should represent the mixed milk of the entire herd, and that it should rest with the dairyman himself to determine which members of his herd were yielding poor milk and to cull these out accordingly.

"(6) That the samples be taken at the usual time of milking by a responsible officer, who should assure himself that they were from cows completely milked and in no way tampered with."

The following analysis is given of mixed milks from three herds of cows numbering apparently a total of 66:—

Herd No. 4.				Herd No. 5.				Herd No. 6			
Morning		Afternoon		Morning		Afternoon		Morning		Afternoon	
Butter fats	Solids not fat	Butter fats	Solids not fat	Butter fats	Solids not fat	Butter fats	Solids not fat	Butter fats	Solids not fat	Butter fats	Solids not fat
3·25	8·76	5·75	8·48	3·60	8·66	4·65	8·69	3·95	8·51	5·40	8·32

Fixed Diets.

In all jails in India, the production of vegetables for consumption as part of the convict diet is a sound financial and hygienic effort required of prisoner labour. A good example of financial results is given in the Report on the Prison Administration of Burma, 1915.

"*Jail gardens.*—With a daily average of 567 prisoners employed on gardening, a percentage of 3·27 on the daily average population excluding civil prisoners, vegetables to the value of Rs.1,04,909 were produced, as compared with Rs.1,03,336 in 1914 when the average number employed was 516. In no jail was it found necessary to supplement the supply by purchase, notwithstanding the increase in the prison population. After meeting jail requirements, the surplus supply was sold and the amount

(Rs.9,058) realised was credited to Government. The estimated value of the garden produce, such as paddy, *dal*, condiments and tamarind was Rs.20,366, against Rs.33,641 in 1914."*

On the subject of scurvy the Inspector General of Jails (Major KNAPP, I.M.S.) remarks:

"There has been no outbreak of scurvy in the jails of the Province, but a few sporadic cases occurred at Rangoon together with cases of pyorrhoea, from which it is not always easy to diagnose."

Scurvy in Indian troops.

Captain Crawford BOYD, I.M.S., in the *Indian Medical Gazette* of February, 1917, writes an interesting account of cases of scurvy which appeared amongst recruits at Dharamsala. He shows that the diet contained in grammes, Protein, 149·4, Carbohydrates, 927·25, Fats, 119·07, or a total ration of 5,470 calories. He concludes that there is "no deficiency as regards the quantity of the classes of foodstuffs."

For curative measures (fresh vegetables being difficult to obtain) two ounces of lime juice were given. Experimentally, yeast was employed for a short time. Two cases were placed on fresh milk and plenty of fresh vegetables, besides the lime juice. Two other cases were placed on fresh milk and eggs and vegetable juices—the latter being extracted and added to the milk.

Captain Crawford Boyd ends his calculation as follows:—"One of the most notable features of the cases is the relatively slow progress towards recovery, even when given a liberal diet of fresh food and vegetables, and also the fact that lime juice secured very little beneficial effect *per se.*" He then proceeds to discuss present day views as to the proteins and "other constituents." He however makes no allusion to the presumable *fons et origo mali*, namely, the fact that the vegetables allowed with the ration amounted to only "one chittak [2·05 oz.] every *second day.*"

Tinned Fish.

The Commissioner of Public Health, Western Australia, Dr. R. C. Everitt ATKINSON, in his Annual Report for 1915, gives the following analytical results:—

"It is not unusual to meet, in the case of canned fresh herrings, specimens giving a metallic tin content in the fish of from 2–5 grains per lb.

"It has not been my experience previously, however, to find corrosion of cans, and consequent contamination of the contents, in the case of sardines.

"During the year one parcel came to hand, four cans of which showed marked corrosion, and the contents of which gave, on analysis, the following figures respectively:—

	Grains tin per can.	Grains tin per lb.
Sample No. 1 contained ..	1·05 ..	2·07
Sample No. 2 contained ..	1·25 ..	2·28
Sample No. 3 contained ..	1·07 ..	2·14
Sample No. 4 contained ..	1·13 ..	2·00

"Lead was not present in any of the samples.

"The age of the article was not available, so that this, or the use of inferior tin plate, may have been responsible. There was no rancidity of the oil noticeable, but the fish was soft and friable [p. 26].

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* Report on the Prison Administration of Burma for the Year 1915. 1916. Rangoon: Office of the Superintendent, Government Printing, Burma. p. 7.

The Sweetening of Sugar.

The report of the Health Officer, Corporation of Madras, for 1915, exhibits a photograph of a coolie conducting the manufacture of a sugar that is much appreciated by Indians, on account of its peculiar sweetness. The Health Officer's object was evidently not to help sales of the commodity, and, as Indian customs are not necessarily doffed with entry to the Colonies, the interest may be more than local. The photograph shows a coolie, clothed in a cap and waist-cloth, triturating a mixture of sugar by a method thus described :—

> " Aska sugar is dissolved in water and boiled in iron chatties or bowls until it is made into paste. It is then poured into another chatty and country brown sugar or powdered jaggery is added to it in the proportion of (8) eight parts of country sugar to 100 of Aska. Then the whole thing is stirred up well with an iron oar until it is well mixed and condensed. This is then finally spread on the bare floor in an ill-ventilated room and crushed with a wooden rod. . . . A coolie with a bare body gets on the rod and supported by two sticks works at the mass backwards and forwards until it is reduced to a soft fine powder. It is then packed for sale. There is a large demand for this sugar. It is considered sweeter than Aska or foreign sugar. But it is very likely that during this operation, the sugar is contaminated with sweat, dirt and, probably, spit."

WATER.

Alum as a Purifying Agent.

Captain J. MORISON, I.M.S., as a result of numerous experiments, comes to the conclusion that " the best dose of alum for the perfect clarification of soft water is obtained by adding half the equivalent weight of alum necessary to react completely with the alkalinity calculated as calcium carbonate. For a hard water, the same rule holds good ; but an equally good clarification can be obtained by the use of a smaller dose and a mechanical filter."*

Mechanical filters and alum.—Lt. Col. GIBSON, I.M.S. in the Annual Report of the King Institute, Guindy, Madras, for 1916,† reports results of experiments as to effectiveness of mechanical filters aided by alum. He states :—

> " The experiments were conducted on two lines. Firstly, to ascertain whether with the addition of the quantity of alum specified by the manufacturers, viz., 1½ grains per gallon, the yield of 100 gallons per square foot per hour could be obtained. This was found not to be the case. Whether the maximum flow was attained by a progressive rise from 20, 30 and so on, gallons per square foot per hour or was tried from the start, no perceptible improvement was got when that maximum was 100 or 75 gallons per square foot per hour. Noticeable improvement was got with the Mather and Platt filter when the maximum was 50 gallons per square foot per hour, but none with the Jewell or with the Patterson filters. It did not seem desirable to carry out any farther experiments with such a greatly reduced yield. Secondly, it was tried whether an increase in the amount of alum could bring about the desired result. This was found to be a much more promising line. With 3 grains of alum per gallon and at 50 gallons per square foot per hour, there was a notable improvement in the quality of the yield from all three filters, the reduction in the total count being specially marked. The improvement was even more marked when

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* *Indian Journal of Medical Research.* 1916. April. p. 565.

† Report on the Working of the Micro-Biological Section of the King Institute, Guindy, for the Year 1916. 1917. Madras: Printed by the Superintendent, Government Press.

4 grains of alum per gallon were added, the rate of 50 gallons per hour being maintained. With five grains of alum per gallon the good quality of the yield was maintained when the flow was gradually raised from 50 to 100 gallons per square foot per hour and with five grains of alum finally the full rate of 100 gallons per square foot per hour was obtained *ab initio*, with results quite as good as when the flow had been gradually raised from 50 to 100 gallons per square foot per hour. . . . Whether sufficient bacterial improvement can be got in a badly contaminated water with a reasonable addition of alum has got to be proved."

Sand filters.—The condition under which the sand filters were operated gave excellent results which are thus described :—

"Normally the minimum volume of raw water tested for lactose fermenters was 1/100 of a cc. and the maximum volume of filtered water tested for their absence was 360 cc. These limits were purely arbitrary and only fixed upon from practical considerations, such as time, consumption of media, etc. In a series of experiments, it was decided to test the raw water down to 1/1000 cc. or one milligramme of water, and to carry the tests for absence of lactose fermenters up to so large a volume of water as one litre. Even these wide limits were not found sufficient to completely estimate the purifying power of a properly worked sand filter. For days together, the covered sand filter showed no lactose fermenters in a litre during which time the raw water often showed them in 1/1000 cc. This corresponds to over a million-fold reduction in the lactose fermenters, far beyond anything, I think, that has yet been recorded from sand filtration." [p. 2.]

The filters having been "tuned up" to this state of perfection ultimately failed to continue to afford satisfactory results. The problem arose as to the cause of change of behaviour. Various theories were suggested, such as that there is something contained in the sand which became exhausted, that a time is approached when the whole of the filter material should be washed and replaced, or that a physical alteration of the sand caused failure to support the filtering skin. Experiments made to exclude these theories led to the conclusion that there was no reason "to reject the belief that the function of the sand is a purely mechanical one, namely, to support the filtering skin of organic matter and microscopic growth deposited from the water itself."

Permanganate of Potash.

This chemical is so largely used in the tropics for water purification that the following dictum of Dr. HANKIN, M.A., Chemical Examiner and Bacteriologist to the Government of the United Provinces of Agra and Oudh, India, conveyed in his Report for 1916, is worthy of being held in mind when packing for tours :—

"Remains of a box were sent me that had been found burning on the railway platform at Cawnpore. The remains included some powder in which permanganate was detected. Investigation showed that the accident was due to the permanganate having been packed in a pine-wood box. Permanganate, though itself uninflammable, readily gives off oxygen and hence may aid or initiate the burning of combustible substances." [p. 3.]

The Lyster Water Sterilizing Bag.

The Report of the Surgeon General, U.S. Army, for 1916* alludes to a bag which has recently undergone a trial by American troops proving it to be "an indispensable article of equipment in the future";

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* Report of the Surgeon General, U.S. Army to the Secretary of War 1916. Washington: Government Printing Office.

in that, by its means, dubious water can be rendered potable. Not only were reports received from troops in the United States as to the efficiency of the system, but the opportunity for trial presented by the late punitive expedition into Mexico was taken advantage of to secure evidence of its use, under practical service conditions. This bag is the invention of Major W. J. LYSTER, U.S. Army Medical Corps. It is thus commented upon in the Report:—

"An appliance designed by Maj. William J. Lyster, Medical Corps, . . . consists of a canvas bag of specially woven flax, 20 inches in diameter and 28 inches in length, sewn to a flat galvanized-iron ring, hinged so it folds at one diameter. Spliced at four equi-distant points on the ring are two crossed pieces of hemp rope, enabling the bag to be suspended on any convenient support capable of holding the weight of the bag when filled with water, which is about 330 pounds. Five nickel spring faucets are placed at equal spaces about the bottom edge of the bag. The neck of these faucets is small enough to enter a canteen which can be filled in 10 seconds. The self-closing faucets prevent wastage.

"The purpose of the bag is not for transporting water, but to provide a stationary receptacle in which water can be held long enough to sterilize and then distribute it. The empty bag weighs from 7 to 7½ pounds and folds into a convenient package for carriage in the field. It thus can be carried by the soldier on the infantry pack when other transportation is wanting.

"After the bag is suspended and filled with water, it is sterilized by the addition of a small amount of hypochlorite of calcium. This is carried in measured doses, sealed in glass tubes. A package of 60 of these tubes weighs 10 ounces and measures 7½ by 3½ by 4½ inches. Packed in corrugated paper it will stand rough usage.

"The tubes themselves are 3 inches in length by three-fifths of an inch in diameter and are marked with a file enabling them to be easily broken in the fingers without fragments. They contain from 14 to 15 grains of calcium hypochlorite. This chemical contains from 30 to 32 per cent chlorin, which forms in the water hypochlorous acid and results in sterilizing the water. The process is one of oxidation. In the strength used waters highly infected are rendered safe. Of course, in such strengths (1-500,000) grossly polluted water such as sewage will not be rendered safe. Water ordinarily used will be entirely safe after being so treated. As the chemical acts more efficiently in clear waters, a filter cloth, to be fastened over the opening of the bag and weighing 1 ounce, is provided or water may be strained through a blanket. The bag is filled after it is in place. Suspended matter, such as clay, is largely removed and not left to interfere with the action of the chlorin.

"Comprehensive experiments demonstrate the bacteriological efficiency of the appliance. The organisms causing typhoid fever, the dysenteries, including amoebic or tropical dysentery, and ciliates are promptly destroyed. Even in the vegetative form amoebae are killed in 15 minutes—ordinarily 5 to 10 minutes suffices after the addition of the powder to render the water safe to drink. Exposure of 30 minutes has been found to destroy all amoebae and ciliates under most severe conditions in a test. . . .

"Among the more important merits which the bag possesses may be mentioned:

"1. Its portability, thereby making it adaptable for use by small commands segregated by necessity from the main column of troops.

"2. Simplicity of operation, thus insuring prompt and efficient service and a supply of potable water, not raised in temperature, whenever the demand arises.

"3. Availability of potable water, obviating the desire to quench the thirst at streams, irrigation ditches, etc., on the march, since the canteen is sterilized and the filling of it supervised by those competent to determine potable water.

"4. The lessening of the possibilities for ingesting, through unsterilized water, of organisms causing typhoid fever, the dysenteries, including amoebic or tropical dysentery, thus making for a minimum sick rate and for a greater efficiency among the troops.

"The hypochlorite of calcium used as the sterilizing agent in connection with the bag is put up in hermetically sealed glass tubes and the tubes packed in a corrugated paper container, making a light, portable package, with little or no weight added to the pack on the soldier's back. The containers being made of corrugated paper will stand much rough usage without danger of breaking the tubes and robbing them of its active agent—chlorin."*

It is obvious that this ingenious apparatus should prove of advantage not only to troops but to civilian travellers, on duty or pleasure, in the tropics.

A water service.

Under this term there has been inaugurated in Egypt, under the Director of the Hygiene Institute, with the collaboration of the Chief Engineer of Municipalities and Local Commissions, a staff whose duty it will be to maintain a regular inspection of all public water supplies private or public. During the past year, 1,264 samples of water were subjected to bacteriological and 399 to chemical examination. The question of suitability of sand for filters was entered into. All consignments of "aluminium sulphate" or "alumino-ferric" were examined for absence of arsenic. The following statement shows that the new staff has a useful sphere before it:—

"It has generally been found that the engineers in charge of the various provincial installations welcome any suggestions for the improvement of the supply and, as a rule, take a genuine pride in their works. Considering the great influence which a good and safe water supply naturally has on the health of the population, it is to be hoped that means will be found for the extension of this Service, with a view not only to the control and improvement of existing supplies but also to the study of the many problems connected with drinking water in Egypt."†

Diarrhoea and Dysentery in Poona.

In hunting for the causative agent of an epidemic, the sanitarian must needs put aside tendencies to form pet theories. At the present time, the fly as a conveying agent is so highly in favour that the more ancient connection between water supply and diarrhoea and dysentery, is apt to receive less patient investigation than might be desirable.

In a paper which appeared in the *Indian Journal of Medical Research* of April 1916, by Captain MORISON, I.M.S. and Captain W. D. KEYWORTH, I.M.S., the theory that in Poona there was a close connection between these diseases and the prevalence of flies has undergone considerable modification. It was found by them that whilst there was recognizable as a seasonal phenomenon a correlation between the numbers of flies and dysentery and diarrhoea from the 10th June to the 12th August, the increase of the epidemic wave in that month could not thus be accounted for. They found that this was connected with accession of pollution to the water supply, and "in like manner the whole of the preceding epidemic can be definitely related to the pollution brought to Poona by antecedent floods in the catchment areas."

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* *Loc. cit.* pp. 93-94; 98-99.

† Egypt, Ministry of the Interior, Department of Public Health. Annual Statistical Report for 1915. 1917. Cairo: Government Press. (p. 52.)

"During 1915, treatment of the water supply with hypochlorite of lime was undertaken. Flies during this year were as great a nuisance as usual, but the effect of the treatment of the water on the annual epidemic was so great that, in the city, during the usual epidemic months of July and August, there was no increase of the deaths from gastro-intestinal disease and no increase in the child mortality. In the cantonment, where the annual epidemic had already shown itself, treatment of the water was followed at once by a complete disappearance of the epidemic.

"The evidence indicates that flies, in spite of their number, do not contribute appreciably, if at all, to the mortality in the native city of Poona, or to the annual epidemic of gastro-intestinal disease in Poona cantonment."

SANITARY ORGANISATION.

DISTRICT COUNCILS AND LOCAL BODIES IN INDIA.

These are Public Bodies which raise funds by taxation under certain Acts, and deal with local matters in rural areas in respect to road making, public buildings (other than the property of Government), education, and administration of public health. They are worked on a parental system of self-government by Local Governments. Their members are chiefly Indians, who are in part elected by the ratepayers and in part are nominated by the Local Government concerned. European officials are also members, and usually the chief magistrate of the district is the President of the Board. The Medical and Sanitary Officer of the District concerned is also always a member. The rate of progress of these boards in the art of self-government necessarily differs with the type of people from which the members are derived. Hence, in the following notes derived from the Annual Reports of certain of them, differences in rate of progress in sanitation are found to be considerable.

Central Provinces and Berar.

The 1911 census population (including Municipalities) was 13,916,308. The incidence of taxation per head, in the rural area, was Rs.0. 1. 7 per cent. The total receipts excluding opening balance were Rs.40,49,884, and including the balance Rs.60,41,703. The following was the expenditure: –

Education	Rs.8,00,000
Including Educational Buildings	Rs.4,24,381
Hospitals and Dispensaries	Rs.125,537
Sanitation charges	Rs.30,644
Plague charges	Rs.6,976
Water supply	Rs.34,943
Drainage	Rs.29,493
Communications	Rs.4,04,315
(Original works and repairs)	Rs.1,97,739

Of the total, Education fell heir to Rs.12,24,381 of which the Government contributed Rs.7,99,605. The total sum received by way of fees for tuition was Rs.6,586. Including cost of buildings, therefore, Education received 30 per cent. of the whole income, excluding opening balance, against 16 per cent. for communications, for medical relief 3 per cent., and for sanitation 3·7 per cent.—including cost of sanitary works.

The method of apportioning the Budget does not seem to have influenced favourably the health of the people. In 1914–15, the death rate for the whole area was 36·69 per mille, and the infantile death rate 263.89 per mille of births.

The District Board in Bihar and Orissa.

The total income of the Board was Rs.82,68,506. Of this, on account of Education, Rs.15,93,495 or 17·3 per cent. was spent. For medical relief, 141 dispensaries wholly paid for by the Board were maintained besides 79 dispensaries aided by grants. The latter expenditure when "lumped" [as the writer thinks strongly should not be the case] with sanitation charges, amounted to Rs.7,66,108, or 7·6 per cent. between both heads. When however the charges for sanitation (Rs.95,877) are regarded alone, they amount to only 1 per cent. of the total income. The sanitary work done by the Boards from this small allotment "was chiefly confined to cleaning of villages, disinfection of wells, improvement of water-supply and sanitary arrangement of fairs." There is however some saving grace in the fact that, whilst for education the allotment includes the cost of building schools, the charges for sanitation after being made unrecognizable by being classed under the head "medical," do not take cognizance of sums spent for water-supply and water-works (Rs. 2,34,217) and drainage (Rs.51,059). Even when thus contrasted with the disproportionate amounts spent in education, there is much room for the following remarks made at para. 28 of the Review*:—

> "His Honour in Council trusts that sanitation including water-supply will receive increasing attention in the future. Every effort should be made to secure the services of qualified and energetic Health Officers (the Sanitary Inspectors referred to in section 91 of the Local Self-Government Act) who will see that the measures undertaken by the Board are carried out with intelligence and efficiency."

Communications.—In the following sentence, the Review points to the necessity of District authorities not forgetting that a railway passing through a tract of country is of little real utility from a commercial and communal point of view, unless there are good feeder roads:—

> †"Turning to communications, His Honour in Council trusts that efforts will not be spared to improve the main traffic routes. Experience has shown that Railway development, so far from rendering roads unnecessary, increases the need for good feeder communications, while in areas as yet untraversed by the railway, good roads, properly bridged and surfaced, so as to be passable throughout the year, are an imperative necessity, if these localities are not to suffer in comparison with tracts more favourably situated nor to be deprived of the benefits, medical or educational, afforded by the District Board."

District Boards in the Punjab.

In 1911, the census showed that the population of the Punjab had been considerably decreased, owing to the prevalence of plague. It then amounted to 19,974,956.‡ The incidence of taxation per head of the population in 1915–16 was As. 3. p. 9. The total income of Districts Boards, excluding opening balance, was Rs.74,56,596. Of this amount, there was spent on education (including approximately Rs.500,000 for school buildings) a total of Rs. 2,81,41,740, or 37 per cent. But of this, 13 per cent. was recovered in fees. Including original work and repairs Rs.2,356,654 was spent on communications; on medical relief Rs.437,233 or 5·8 per cent., and on sanitation charges

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* Municipal Department, Local-Self Government. Resolution reviewing the Reports on the Working of the District Boards in Bihar and Orissa during the Year 1915–16. 1916. Patna · Printed at the Bihar and Orissa Government Press.

† *Loc. cit.* p. 8.

‡ In British territory in 1901, the Census population was 20,330,337.

(20,276) water-supply, water-works and drainage works, a total of Rs.58,125, or 0·78 per cent. To this might be added cost of vaccine establishment and charges (Rs.96,031) making the direct and indirect expenditure on sanitation amount to 2 per cent. of total income.

The result of this method of dividing the income, so far as sanitation is concerned, is thus described in the Report:—

> "There is little to note with regard to the progress of rural sanitation. A few small works in connection with the drainage or water-supply of large villages were undertaken, and a tax was imposed on the residents of Dijkot in the Lyallpur District to pay for a staff of sweepers and for other expenses in connection with the sanitation and lighting of the village. The District Board of Gurgaon has drawn up a set of simple rules which are now under consideration to regulate the collection of manure in villages and to ensure the purity of the water-supply, for adoption in villages which agree to them; and the Sialkot board is contemplating the imposition of a sanitation tax in Kotli Loharan. Such a tax is now in force in a considerable number of villages in various districts, but the reports are silent as to the efficacy of the measures which have been rendered possible by this self-imposed taxation in promoting the sanitary improvement of the villages concerned, and His Honour would be glad if the subject were mentioned in future reports."*

The death rate in this Province in 1915 was 36.3 per mille. 244,104 deaths were due to plague and 13,196 to cholera.

Municipalities in Burma.

Finance. During 1915–16, there existed 44 Municipalities in Burma, excluding Rangoon. The incidence of taxation ranged from Rs.8. 8. 6. in Maymyo (a hill station) to Rs.0. 15. 3 in two small Municipalities. According to the Burma Government Review of their working, there has been a tendency to hoard cash at disposal, and thus restrict the sphere of improvements.

> "It is noted that the closing balances of most town funds still remained unduly high. The policy of hoarding up reserves is seen in its extreme form in the cases of Nyaunglebin, Pyawbwè and Lashio, where the closing balances actually exceeded the annual income, and in the cases of Shwedaung and Magwe, where the balances at the close of the year were over 60 per cent. of the annual income. There may be an explanation in some of those cases, but none has been given in the reports. In Shwedaung, however, the closing balance was considerably less than in the previous year, while in Kyônpyaw it was reduced by nearly three-fourths. The reports suggest that there is no dearth of suitable objects on which the Town Committees could profitably spend considerable sums. A remark made in one report makes it necessary to point out that 10 per cent. of the annual expenditure is ordinarily a sufficient closing balance and that the falling of that balance to a mere 38 per cent. of the annual ordinary expenditure should not give rise to undue alarm as to the financial position of the town fund."†

Water supply. Bored wells have been largely successful in Burma. In using this method, however, of securing water supplies, a certain number of failures must be expected if a source of supply (in an already explored stratum) has not been already proved to exist. First attempts have frequently much the nature of an "exploratory operation." The Review records the following unfavourable results of efforts :—

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* Report on the Working of District Boards in the Punjab during the Year 1915–16. 1916. Lahore: Printed by the Superintendent, Government Printing, Punjab. pp. 6–7.

† Resolution reviewing the Reports on the Working of Municipalities in Burma during the Year 1915–16. 1916. Rangoon: Office of the Superintendent, Government Printing, Burma. p. 8.

> "The experimental tube wells sunk at Pakôkku and Myingyan with the aid of Government grants proved failures, the water found at the latter place being undrinkable, while the tube at Pakôkku after having been sunk to a depth of 455 feet struck solid rock which prevented further boring. The Gyobingauk tube well has proved a failure as water has not been found even at a depth of 856 feet. Of two tube wells started at Shwebo, one was more or less successful and the other a complete failure."*

Conservancy. Aerobic filter latrines have been introduced in Pyinmana and Pegu, Syriam, Pyapon, Kyaikto, Kyauksè, Sagaing and Myingyan. Minbu and Allanmyo also contemplate their adoption. The Burma Government call attention to the remarks of their Sanitary Commissioner on the subject in the 44th paragraph of his Report for the year 1915.†

Reclamation by dredging. This method is peculiarly suitable for effective elevation of sites and filling depressions in delta land. The Report states :—

> "Proposals for the reclamation of the recreation ground and the foreshore at Ma-ubin were administratively approved and these areas are now being filled up with sand dredged from the river. Reclamation of low-lying lands by a similar process was carried out at Pyapôn, while schemes on similar lines were under consideration at Yandoon, Bassein, Henzada and Wakèma (where certain blocks have already been reclaimed in this manner)."‡

Assam Municipalities.

The Review § by the Assam Government of Municipal Administration during 1915–16 shows that "the average incidence of taxation for the Province per head of population rose from Rs.1. 12. 8 to Rs.2. 0. 9. . . . The Chief Commissioner has repeatedly emphasised the necessity for Municipalities to show that they are utilising their own resources to the utmost before they apply for special assistance from Government; and he is glad to observe that the increased incidence of taxation which is reported for the year indicates that this principle is gaining general acceptance."

The percentage of expenditure in water-supply to the total Municipal expenditure rose from 13·94 to 18·32. On conservancy the percentage on the same bases rose from 27·03 to 30·82.

Reclamation. The report states :—"A simple means for raising sites and filling up insanitary hollows was tried in Habiganj with considerable success, and may be found useful elsewhere. Two large tanks were baled out and all who wished to do so were invited to take earth from them. The invitation met with a ready response."

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* *Loc. cit.* p. 5.

† See this *Bulletin* (Sanitation Nos.) Vol. 4. No. 8, and Vol. 7. No. 7.

‡ Resolution reviewing the Reports on the Working of Municipalities in Burma during the Year 1915–16. 1916. Rangoon: Office of the Superintendent, Government Printing, Burma. p. 5.

§ Resolution on the Working of the Municipalities in Assam during the Year 1915–16. 1916. Shillong: Printed at the Assam Secretariat Printing Office. p. 2.

MUNICIPAL TAXATION.

"No bricks without straw" may, in the present day, be open to doubt, but there can be none as to the truism—no funds no sanitation. The sanitarian who fails to take an interest in the finance of the area in which he advises may continue to obtain satisfactory grants for stationery, but he will find sanitary improvements are few and far between. With newly organised bodies in the tropics there is liable to arise amongst members a difference of opinion as to the most practical method available of working the Act they administer for the gathering of funds. Possibly, the District Municipalities of the Madras Presidency follow methods that are adaptable to most tropical towns, sufficiently advanced to take a position under a "Self Government" scheme. Hence is briefly quoted from an Order of the Government of Madras* some of the methods of taxation mentioned in the Review of the Municipal Administration Reports of 66 municipalities, as possibly of utility elsewhere: -

Tax on buildings and land. This is assessed on the annual rental value, at a rate not exceeding 8½ per cent., but in certain classes of unoccupied lands and sites, this method is replaced by an acreage rate. To secure that correct assessment of buildings is attained, the register and buildings are periodically examined, and house rental values are revised, as necessary. The average incidence of this tax on buildings during 1915–16 was Rs.4. 0. 3. The total collection was Rs.16,07,660.

Water and drainage tax on buildings and lands. "This tax is assessed on the same principles as the tax on buildings and lands, but an exception is allowed in respect of agricultural land, which receives no benefit from the municipal water-supply or drainage works." Under this head, a sum of Rs.8,20,364 was collected.

Tax on arts and professions. Certain arts and professions, as defined in the Act only come within the scope of this tax; the man of medicine is of course not exempt. The aggregate number of persons assessed under the tax was 70,777, or 3·2 per cent. of the population, and the average incidence was Rs.4. 0. 3. per head.

Tax on vehicles, animals and carts. Under this tax, a sum of Rs.337,269 was realised. The Government Review soliloquises sadly —"There is reason to believe that the assessment lists are not infrequently incomplete."

Other Modes of Collecting Money :—

Conservancy receipts. A municipality may contract with the tenant of a house possessed of a private latrine to undertake scavenging services. Similarly, it may permit a private contractor to undertake these services. Under the former method, Rs.112,335 was collected, and under the latter Rs.248,609. In both instances, the principle is supposed to be adhered to that the fees shall not be greater than will permit any establishment engaged being paid without surplus: the object being to encourage conservancy of private latrines.

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*Government of Madras. Local & Municipal Dept. (Municipal). G.O., etc., Nos. 393–94 M., 3rd March 1917.

Revenue from markets and slaughter-houses. These, ordinarily, are built from Municipal funds, and the right to use these buildings is granted on profitable terms. The arrangement secures that correctly designed buildings shall be used for the important purposes intended, and that they are maintained in a sanitary condition.

License fees. Under this head, all " dangerous and offensive trades " are required to obtain licenses for which fees are paid. The licenses lay down the sanitary requirements to be fulfilled, and detection of any lapse of requirements is followed by cessation of the right to trade pending rectification. When it is thought that persons are poor, they are prevented from exercising a trade classed as " dangerous or offensive," unless they bind themselves to fulfil certain conditions in the interest of sanitation ; but this license is issued without fee. Under this arrangement, the petty washerman (dhobi) and his washing place, ironing arrangements and storing places are duly brought under control. The Madras District Municipalities were the first in the East not only to grasp the importance of this principle as to laundry work, but to secure the sanitary control of soda water and ice factories.

THE ORIENTAL AND THE DRUG HABIT.

The sacrifice by the Government of India of a large slice of the Revenue derived from sale of crude opium is fast being rendered of little utility by substitution of the sale of cocaine, or of the supply of morphia by the hypodermic syringe ; the latter usually being administered—accompanied by the attendant evil of unsterilized needles—by vendors at so much per injection. The Inspector-General of Prisons, Burma, in his Report for 1915 makes this statement on the subject :—

" *Morphinism* caused 100 admissions and 16 deaths, against 195 and 15, respectively, in the previous year. Eighty-nine admissions and 11 deaths are recorded against the Rangoon Jail, where the admissions and deaths in 1914 numbered 185 and 15, respectively. The abuse of morphine and cocaine was again a very important factor at Rangoon where a large proportion of the deaths are directly or indirectly due to drugs. The following table serves to show this factor :—

Year.	Percentage of deaths due to drugs.
1909	7·8
1910	25·0
1911	34·0
1912	37·6
1913	43·3
1914	49·0
1915	41·8

" I regret that I have no space to elaborate this important matter. It may be added that morphinism appears in other jails now, e.g., Prome and Henzada—so that the habit must be spreading into the mofussil. . . .

" *Opium consumers.*—11·30 per cent. (against 13·41 per cent. in the previous year) of the total number of convicts admitted to jail confessed to be addicted to the use of the drug. The highest percentages are recorded against Akyab (42·49), Bhamo (42·45), Mogôk (34·81), Kyaukpyu (33·47) and Katha (25·77)."[*]

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[*] Report on the Prison Administration of Burma for the Year 1915. 1916. Rangoon : Office of the Superintendent, Government Printing, Burma. p. 15.

FACTORS IN SPREAD OF EPIDEMICS.

Perusal of sanitary reports of "the sixties" show that it was fashionable in discussing the spread of epidemics to give vast attention to meteorological conditions. This opened a wide field for theorising. These conditions still afford room for dissertations when allied to the biology of "carriers." It is, however, but rarely that the indubitable influence of traffic routes and the peculiar customs of a people attract attention as factors. Yet, amongst rural populations in the tropics, these two factors cannot be safely ignored in arriving at conclusions as to method of spread. In the Annual Medical Report of the Nyasaland Protectorate for 1915, Dr. HEARSEY, the Principal Medical Officer, proves that generalizations may have exceptions. In regard to the spread of small-pox (the first epidemic during the last six years) in Lilongwe and, to a lesser extent, in the contiguous Dowa District, he states [p. 9]:—

> "The spread of the disease in these two districts has entirely been due to the difficulty that has been experienced in preventing natives from infected villages visiting their relatives and friends in uninfected areas."

At p. 12, he gives reasons for the epidemic under such conditions being limited to the two Districts:—

> "Although this outbreak assumed epidemic proportions in these two districts, a noteworthy fact is that the infection has not, up to the present, spread to any of the adjoining districts. Lilongwe and Dowa are inhabited by the same race, amongst whom there is constant inter-tribal communication; and this explains why the outbreak has been of so limited a character."

CEMETERIES AND MOSQUES.

According to the Annual Statistical Report of the Department of Public Health of the Ministry of the Interior (Egypt) for 1915, the Directeur des Services Sanitaires under a ruling dating back to 1877, has the power to grant "special authorization for burial in private mausoleums not necessarily situated within cemeteries." It is explained that:—

> "Apart from the essential condition that no harm shall result to public health from the position of the mausoleum, the principle underlying the granting of this privilege is that the applicant must be a man of some note, of high character, and must have performed some work of benefit to the community. The details as to the application of this principle were worked out and agreed to by the Ministry of the Interior by their letters No. 186 of November 29, 1914, and No. 1918 of December 22, 1914."

PREVENTION OF MORTALITY IN EGYPT.

The late Lord KITCHENER took up the question of sanitation in Egypt seriously. Necessarily, during the war improvements inaugurated during his tenure cannot be much added to. It will however be possible for Sir David SEMPLE (the Director) and his Health Staff, as a result of organization and laws supporting action, to make their presence felt beneficially the moment war is over. Of the great necessity for effort, the following figures from the Report of the

Department of Public Health, Egypt,* for 1915, p. (9) leaves no doubt:—

Locality.	Death-rate all ages. per annum per mille.	Infant mortality 0–1 year. per mille of births.
Cairo	44·8	327
Alexandria	49·4	237
Port Said	49·4	155
Suez	60·2	198
Ismailia	78·6	158
Zagazîg	43·8	237
Tanta	52·9	266
Qena	56·3	311
Assiût	55·4	309

The heavy infantile mortality bespeaks evil sanitary conditions, of which the heavy general death-rate is a further practical demonstration. Pending radical engineering improvements, there has been an effort to decrease infantile and maternal mortality by substituting for the untrained the trained midwife—so called " Dayas." These obtain certificates after receiving what would appear to be a short course of training, namely, four months. They now number 493. During the year, they attended 1,760 midwifery cases. The Director advises that a Maternity Hospital and Training School be founded at Cairo, so that it might be possible to train a superior class of midwives to be known as " Qâbila."

SANITARY EFFORTS IN THE U.S. ARMY.

With GORGAS at the head of the Medical Department, it is not surprising to find that as in Panama so amongst the men of the U.S. Army malaria is fast becoming innocuous. According to the Annual Report of the Surgeon-General, 1916, the admission rate amongst 100,000 men for malarial fevers was 25·16, and the constant sick rate 0·54 per 1,000. In the Spanish War the total mortality rate was 33·03 per 1,000 of strength. The death-rate from typhoid fever amounted to 13·84 per 1,000; but, in 1916, in a strength of 100,000 men, *there was no death from this cause.* Irrespective of improved general sanitation, this has been greatly due to the fact that there are no " conscientious objector " clauses in laws, made by this most democratic of all Governments, to enforce prophylactic measures. For instance, anti-typhoid vaccination was put on its trial, was found effective, and was therefore *enforced.* Similarly, there are no half measures as to venereal diseases. The system applicable in the latter case is thus described†:—

> " Venereal diseases still continue to constitute in the Army of the United States, as in those of other countries, a very serious factor against military efficiency of the Army, just as in civil life these same diseases occupy a similar commanding and threatening position in their relation to the welfare and usefulness of the community and State.

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* Egypt. Ministry of the Interior, Department of Public Health. Annual Statistical Report for 1915. 1917. Cairo: Government Press.

†Report of the Surgeon-General U.S. Army, to the Secretary of War. 1916. Washington. p. 15.

"It should be clearly understood that the Army sanitarians and the military authorities generally are fully aware at this time, as they have been for many years past, of the necessity and importance of attacking and limiting by every possible means these so-called social diseases. To that end there have been formulated and put into vigorous operation measures designed to control to the greatest degree possible these infections, which always have their origin, so far as the soldier is concerned, quite outside of his military life and duties and far removed from any military authority or discipline. It is believed that no more comprehensive system of attack against a disease has ever been instituted in the Army or elsewhere than that at present in active operation in the United States Army.

"It includes, among other features, regular medical examinations twice a month; prompt isolation, quarantine, and hospital treatment until cured of all found with infective conditions; court-martial and stoppage of pay; the hearty encouragement of athletic games and sports of all kinds; the furnishing of rational amusements; libraries, opportunity for study and for school; the best of food and clothing; and last, but not least, an earnest appeal to the moral and ethical side is not neglected.

"In brief, the Army is controlling its own limited area and is successful within its garrisons and camps. The same measures, or similar ones, adopted by nearby civil communities would be equally effective. Until either the sex instinct is abolished or much altered, or Federal control is invoked as in certain other diseases far less threatening, we may expect that the disability from this cause will continue. In the meantime there should be no relaxing of effort on the part of the Army. The fight will be vigorously continued, with constant hope for increasing assistance and co-operation from the civil communities whose interests are quite as vitally concerned as those of the Army.

"In connection with the subject, attention is invited to the remarkable report of the Royal Commission on Venereal Diseases, lately published in England, and also particularly to the recent State legislation in Australia, dealing drastically with venereal infections of every character."

SANITARY RULINGS.

PROTECTION OF MILK.

The requirement that an intending vendor of milk should prove himself not to be a carrier of typhoid is characteristic of American thoroughness. In tracing sanitary developments in America it will be found that, a principle having been accepted, action follows in logical accord with it, to a degree not often found on this side of the water. Thus, it is true that ordinary European legislation might demand cleanliness in all matters connected with milk supply and absence of infective diseases in employés, but to secure a typhoid carrier it would first be necessary to prove by an epidemic that a carrier existed. The means taken in this case, Widal's test, is of course not necessarily convincing, but it would be of value as bringing within the range of supervision a number whose faecal matter and urine ought subsequently to demonstrate the truth. The procedure is thus stated in the Public Health Reports for Jan. 12, 1917 (p. 41) :—

"The commissioner of public safety and the health officer of the city of Rochester, N.Y., required that all applicants for licenses to sell milk should submit to a blood test to determine whether or not they were possible carriers of the typhoid bacillus.

"An applicant for renewal of such a license refused to permit the test to be made and applied to the courts for a mandamus to compel the commissioner of public safety to renew his license. The court refused to compel the renewal of the license. In the opinion Judge Rodenbeck said :

"'It is important * * * to the whole community that the supply of milk and cream should be kept clean, pure, and wholesome and should not be contaminated with impurities or infected with disease ; and it is the duty of the health authorities to see that this is accomplished by the establishment of such reasonable regulations as may be necessary to meet existing conditions or to ward off impending dangers to the public health, and in imposing a blood test as a condition to a license to sell milk and cream in the city the commissioner of public safety and the health officer acted within the scope of their authority, and applicants for such a license should co-operate with the public authorities and assist rather than oppose reasonable efforts to provide pure and wholesome milk and cream for the people of the city. The requirement of a blood test of an applicant for a license is just a step, and a small one, in the direction of the protection of the public health, but every reasonable effort made in this direction should be encouraged so long as it does not unreasonably infringe upon the rights of the individual.'"

TREATMENT OF WASTE.

THE RESULT OF INSUFFICIENT CONSERVANCY

Cause and effect are definitely stated in respect to lack of correct conservancy, in the following extract from the Annual Medical Report of the East Africa Protectorate, for 1915 (p. 41).

" It is only necessary to allude to the unsatisfactory methods of disposal. The nuisance caused by the floating of matter up Mombasa harbour on the incoming tide, the increase of the mass in evidence due to the concentration of thousands of persons on the Island necessitated by the war, has resulted in an increase in the observed cases of enteric and dysentery. Flies have at times abounded, though every effort has been made to check them, not only here but in other places. It is interesting to note that the fly larvae or maggots were observed to penetrate to a depth of 12 inches from the surface in the black cotton soil, in places where removal of excreta or refuse had been ineffectually performed, and in scratching the surface of the superficial earth covering pits some months old, generally a fly hatching could be discovered."

SANITARY WORKS.

WATER PURIFICATION PLANT.

In the Annual Report of the Governor of the Panama Canal for 1916, Mr. G. C. **Bunker**, the Physiologist, contributes an important Section (pp. 120–185) dealing with the microbiological conditions of water-supply. Much has yet to be learnt as to the conditions which, in the tropics, tend to alter the potability of water. Mr. Bunker has managed to compress in the pages quoted much information on the subject derived from original observations, which must have cost much time and determined effort.

He describes the water purification plant at Mount Hope and its results in detail. This supplies Mount Hope and the District north of it, Cristobal, Margarita Island and Colon, including 37,000 inhabitants. There is employed an aeration basin, sedimentation basin, rapid sand filters, clear water basin, and chlorinator. The nature of the plant and (probably most British authorities would think) the sequence of operations differ from those which might be adopted in current practice in Europe; and, therefore, instead of attempting to follow the latter step by step, and finally evaluate the water as delivered to the consumer, it is necessary to dissect Mr. Bunker's description, and thus obtain data as to the influence of each process of purification. In this way, valuable data become available:—

Aeration.—The basin measured 60 by 66 ft. It is "equipped with 85 cone nozzles which are arranged in five batteries of 17 each. The nozzles are so adjusted that, under ordinary operating conditions, the raw water is discharged at an angle of 30 degrees in a thin sheet, which breaks up into fine drops. The average diameter of the circle which would be formed by the discharge of one nozzle striking the floor, would be 24 feet." It was found that whether the water was thus effectively sprayed, or whether it passed from the nozzle in the form of a sheet, following adjustment for varying amounts of water, "the amount of oxygen added to the water and the amount of carbon dioxide removed is practically the same": -

A.- Result of Fine Spray.

Source of sample.	Temperature.	Dissolved oxygen.		Carbon dioxide, parts per million.
		Parts per million.	Per cent. saturation.	
Raw-water tap	28·8° C.	5·09	65·2	2·5
Discharge from aeration basin	28·0° C.	7·38	93·1	0·0

B.—Result of Thin Sheet of Water.

Source of sample.	Temperature.	Dissolved oxygen.		Carbon dioxide, parts per million.
		Parts per million.	Per cent. saturation.	
Raw-water tap	29·5° C.	4·37	56·7	3·5
Discharge from aeration basin	29·2° C.	6·76	87·2	1·5

He, however, says:—

"With increased amounts of carbon dioxide in the raw water a better reduction is effected by a spraying action of the nozzles. The removal of disagreeable odors is also more efficient. An odor of hydrogen sulphide of a numerical value of 5 (Whipples scale) is completely removed by the spraying action of the nozzles."

Sedimentation basins.—"There are three cross connected parallel concrete sedimentation basins, with a total capacity of 2,500,000 gallons." . . .

"Experience has shown that in order to eliminate a multiplication of harmless bacteria in these basins it is necessary to drain and wash the first section of each—that is, the sections into which the aerated water first passes—once a week. Due to the formation of a coarser floc than in similar waters in the States, at least 75 per cent. of the coloring matter and aluminum hydrate deposits in these sections. Every 30 days it is necessary to drain and wash the entire basin, as at the end of this time or earlier small cakes of sludge, 4 to 6 inches thick, will be carried to the top of the water by the gas which has formed by septic action. The predominant odor during the cleaning of the basins is that of boiled cabbage. At times these cakes of sludge will begin to float to the top in less than 30 days after the last cleaning, and if the basins are not drained and cleaned immediately a multiplication of bacteria results in the settled waters.

"In addition, it has been found that the bacteria in the settled water run higher at times during the early morning, when the water from the reservoir is slightly colder than the water in the basins and consequently sinks to the bottom, displacing some of the lower water which contains more bacteria and forcing it to the top, with the result that the settled water taken from the top layers will contain more bacteria than the inflowing raw settled water." (p. 122.)

Rapid sand filters. The sand employed had "an average effective size and uniformity coefficient of 0·41 and 1·70 respectively." . . .

Chlorinator.—"A chlorinator was installed in the latter part of February, 1916. Liquid chlorine is applied to the filtered water as it flows from the clear-water basin to the well in the pump station. Due to the present arrangement of the piping, the water with which the wash-water tank is filled does not pass through the Venturi meter which controls the chlorinator, with the result that the filtered water going both to the tank and the mains is undertreated. The changes necessary to correct this are under way." (p. 124.)

Bacteriological data.—Mr. Bunker's notes on the bacteriological data gathered by him demonstrate the familiar necessity of not being content with ascertaining the number of bacteria present in a water but their quality and whence derived. Notwithstanding the subjection of the water to the processes above noted, the result was that: "In general, the numbers of colonies of bacteria in the filtered water samples have exceeded those in the raw and settled water samples." He affords the following interesting solution of this peculiar result:—

> "This was due partly to a multiplication of bacteria in the water in passing through the sedimentation basins, but principally to a multiplication in the filters, which started in December, 1914, 10 months after the plant had been in operation, and has continued ever since. Examination of the sand at that time showed that it contained large numbers of small and large mud balls. A bacteriological examination of one of the mud balls, mixed with 100 cc. of water and thoroughly shaken, showed that there were 35,000 colonies of bacteria per cc., on nutrient agar at 37·5° C. 24 hours, in the water, or 3,571 per gram of dry sand. Gas developed from both 1 and 10 cc. of the water inoculated into lactose bile.
>
> "During the period from the starting of the plant in February, 1914, to December of the same year, dead micro-organisms and organic matter had gradually accumulated in the filters, due to an inefficient air wash and a low velocity water wash. In the latter month a larger air receiver was installed, and the length of the air wash increased to four to five minutes, thereby thoroughly scouring the sand. In January and February, 1916, the sand and fine gravel in all the filters were washed. The longer air wash has largely prevented the formation of mud balls, but with the amount of vegetable matter in the raw water a certain amount of dirt will always accumulate in these filters on account of the low velocity water wash in use.
>
> "The multiplication of bacteria in the filters has continued up to the end of the fiscal year because it has been impossible to eliminate the species causing the trouble from the wash water. As long as they are present in the latter, even in small numbers, they will be constantly returned to the filters and act as 'starters.' One species formed violet colonies on nutrient agar plates developed at 37·5° C. Soon after the use of liquid chlorine was started and partially sterilized wash water became available this species practically disappeared.
>
> "During the last three months of the year the numbers of colonies of bacteria in samples of the effluents from the filters have averaged 303 cc. as compared with 779 per cc. during the three months prior to the use of partially sterilized wash water. It is expected that eventually the species responsible for the multiplication of bacteria in the filters will be entirely eliminated by washing with sterile wash water." (pp. 125-6.)

From his observations of the Agua Clara purification plant, the fact that "a little leaven leaveneth the whole," and the importance of the full working efficiency of each part of a waterwork, is demonstrated. The sedimentation basin was duly provided with divisions and means of separate cleansing of each. It was noted that an extraordinary multiplication of harmless bacteria occurred in these sedimentation basins. This condition was treated with sulphate of copper at the rate of 4 per million gallons. It was supposed that the bacteria in the raw water would, in this way overcome the bacteria in the sedimentation basin. Although partially successful, no real cure resulted. It was then discovered that:

> "On account of leaky gates it is impossible to prevent water running from the basin in use to the one being cleaned, as a result of which the clean basin is always seeded with the bacteria which multiply so rapidly. It is impracticable to shut down the entire plant once a week so that both basins may be cleaned at once. Up to the present time the method of eliminating the multiplication of bacteria in these basins has not been found, but it is expected that further studies will solve the problem." (p. 128.)

Chemical treatment.—The water at the Agua Clara works was found to be of continual low alkalinity. Hence, as a preliminary to the employment of alum, it was considered "necessary to increase the alkalinity and decrease the amount of free carbonic acid in the filtered water, by the addition of soda ash or lime." Soda ash was put aside, as it was found to "fix" the colour of the water—a detail it was desired to remedy. Lime was then selected. The opinion however is expressed by Mr. Bunker that in a "fixed plant arrangement," it is necessary to effect the removal and precipitation of the colouring matter and iron, prior to the addition of lime. The water received from the filter had the following characteristics:—3·5 to 5·5 of free carbonic acid, 11 to 14 parts of alkalinity, 8 to 13 parts of colour and 0·1 to 0·4 of iron. The effect of this water on galvanised iron pipes was systematically tested. Mr. Bunker states:—

> "From these data it is seen that comparatively large amounts of iron are taken up by this water while standing in the pipe for 14-hour periods. Undoubtedly all of the galvanizing has been removed from the pipe, for in most of the samples collected after the water had been running for 15 minutes the iron content was larger than in the discharge from the filters. Equally large amounts of iron have been found in samples collected under similar conditions from service pipes of different buildings. Not only is there an iron taste in such water, but it forms rust spots on clothes during washing, stains porcelain fixtures, and affects the taste of coffee, tea, and cocoa." . . .
>
> "The noticeable amounts of color and iron in the samples of water collected after standing over night indicate that even with a larger amount of alkalinity and smaller amount of free carbonic acid the filtered water still has a marked corrosive action on galvanized iron pipe. During the 15 days covered in the above table the dissolved oxygen averaged about 6·7 parts per million, or 85 per cent. of saturation." (pp. 131–2.)

THE TRUTH BY METER.

According to the Chief Engineer, Madras Municipality (Mr. MADELEY*) the important subject of waste of water is receiving special attention in the city concerned. (*a*) Complete plans are now ready so as to divide the city into areas, the water supply of which can be isolated so as to check waste. Pending this arrangement being effected, (*b*) house to house inspection is being carried out, so as "to detect and get replaced improper taps and fittings, and to have repaired those that are broken and leaking." Another method applied is (*c*) "to reduce the pressure of the water in the pipes, more especially during the hours of least demand." (*d*) Abnormal waste in any special area being suspected, the valve between the leading main and the steel pipe is closed down, so as to limit the rate at which water can be taken. (*e*) When free supplies are allowed, the householder is required to keep the single tap allowed in a position visible from the road. (*f*) Meters are now enforced where any form of water-supply more ample than permitted free of charge is expected by a householder.

Mr. Madeley insists upon the financial importance of preventing waste. His observations as to meter measurements show that, over and above the free allowance per day, there is a consumption in Madras of 3·85 million gallons; and he holds if "all services were metered and the free allowance reduced, a total income of Rupees 800,000 could easily be obtained." "This would pay all the waterwork charges including interest and sinking fund." In explanation of this statement it is to be held in mind that in India waterworks have not hitherto been undertaken by companies, but are public property financed by local bodies.

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* Indian & Eastern Engineer. 1916. Dec. Vol 39. No. 6. p. 210.

LANDS AND BUILDINGS.

CHEAP BUILDINGS.

There is an unsolved problem for the sanitarian and Engineer alike in India, notwithstanding there have been many gallant attempts at offering a solution ; given a labourer earning Rs.5 to 7 per month with three children (debts not being taken into account), supply an independent residence that will subserve decency, caste and sanitary requirement, at a rent that will allow profit to the landlord. The scavenger might perhaps be taken as a person likely to be content with but little luxury in his surroundings, yet the Madras Sanitary Board (Sanitation No. 57 of 1914) finds that to provide a single room with necessary adjuncts will cost from Rs400 to Rs.600 per hut, according to locality. A type of a hut of this class, as a row of attached buildings designed by that Board, is shown in the annexed plan. It doubtless represents the best that can be done for the money.

*Indian Engineering** reports that an exhibition of buildings was inaugurated by the Madras Government in January, 1916. It is stated that the cheap class of town and village buildings would have walls of unburnt brick, pointed and whitewashed, and roofs of country tiles. One group of six cottages intended for town life consisted of detached buildings in two rows of three,

> "with a conservancy lane separating the rows. The cheapest of these would cost about Rs.1,000 and would provide a living room 15'× 10', bedroom 10'× 9', kitchen 8'× 6', store 8'× 6', and a courtyard 25' 6"× 12' 3" in which are a small latrine and bathing platform. For one providing pretty much the same accommodation with covered latrine and bathroom and a cowshed fitted between them the cost is given as Rs.1,450. Two model buildings, one for a Hindoo, one for a Mohamedan resident of somewhat more ambitious style, are estimated to cost about Rs.2,000 each. There is also a design for a range of quarters suitable for erection in a town or village street, parts of the range providing an upper room but the range, generally, providing only single room quarters. A small length of such a range was built for a model at the Exhibition. The idea of showing the people practically what they can obtain for a certain sum of money is an excellent one ; the designs provide nothing in the way of superfluities so that the individual can see the minimum in the way of a clean, healthy house his purse, as far as it goes, can provide for him. Superfluities and luxuries he can add for himself to the extent of his spare cash."

CONSTRUCTION OF BUILDINGS.

The sanitarian in the tropics in making his recommendations on various buildings has to bear in mind not only the sanitary character of structures, but also their comparative cost in the localities concerned. In such matters he in no way trenches upon the science of the engineer : in neglecting them, under the false conception that this would be so, he leaves sanitary interests to be "muddled through" by unnecessarily crude compromises between sanitary requirements and finance. Hence the following experience gained in Panama should be of utility† :

> "The construction of buildings with bearing walls of hollow concrete blocks or terra cotta was discontinued. All concrete buildings built during the year were designed with poured reinforced concrete main walls

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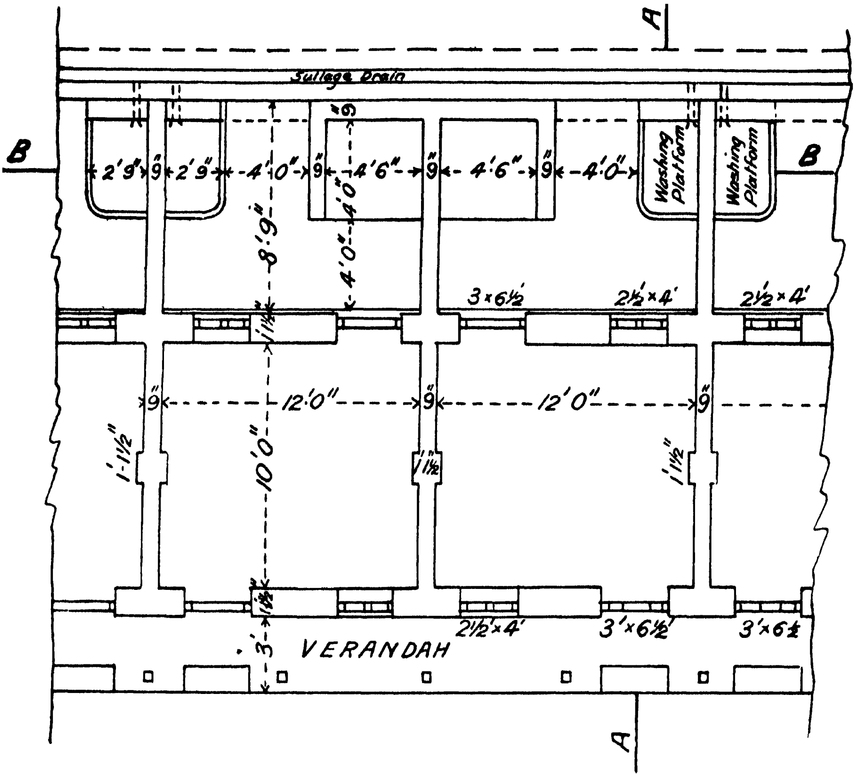
* 1916. Oct. 21. Vol. 60. No. 17. p. 268.

† Annual Report of the Governor of the Panama Canal for the Fiscal Year ended June 30, 1916. Washington : Govt. Printing Office. p. 285.

Design for Scavengers' huts.

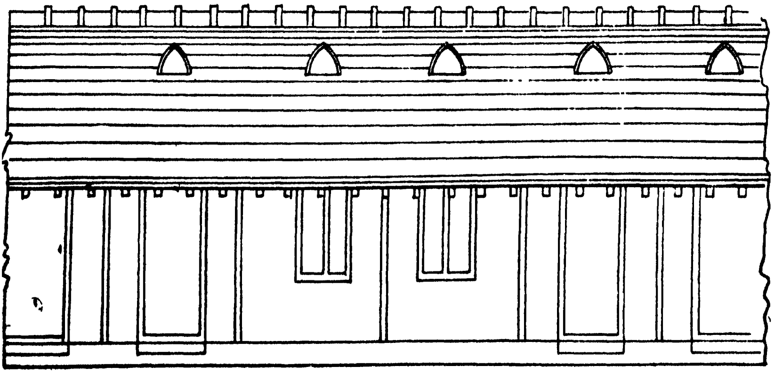
Type design No. 153 (Madras
Sanitary Board; 1914).



Plan.

Design for Scavengers' huts.

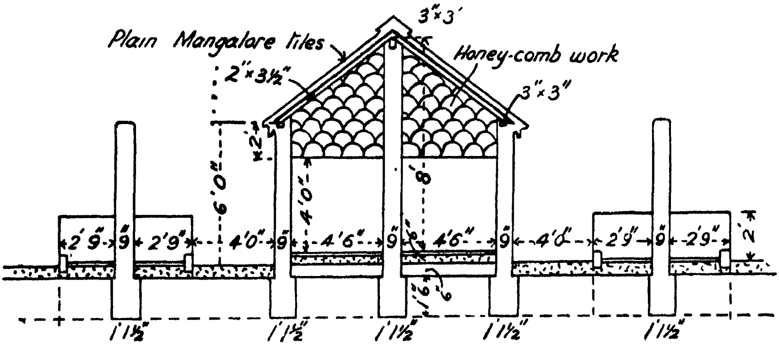
Type design No. 153 (Madras
Sanitary Board; 1914).



Elevation.

Design for Scavengers' huts.

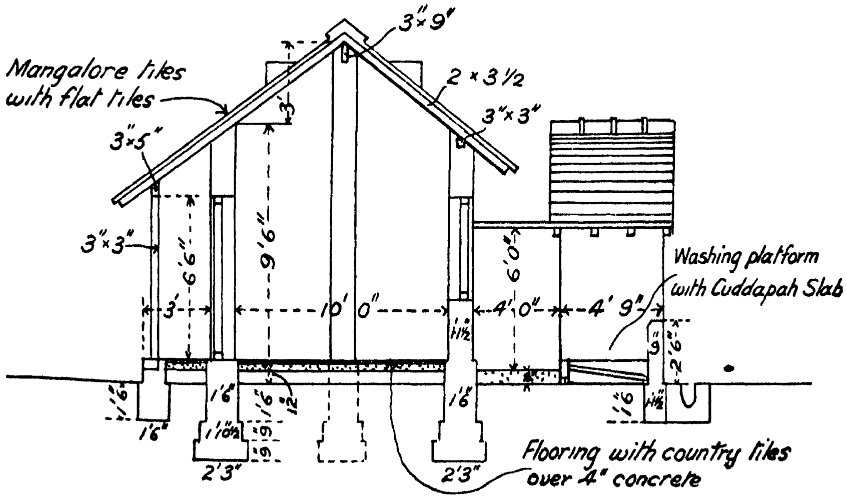
Type design No. 153 (Madras
Sanitary Board; 1914).



Section on B–B.

Design for Scavengers' huts.

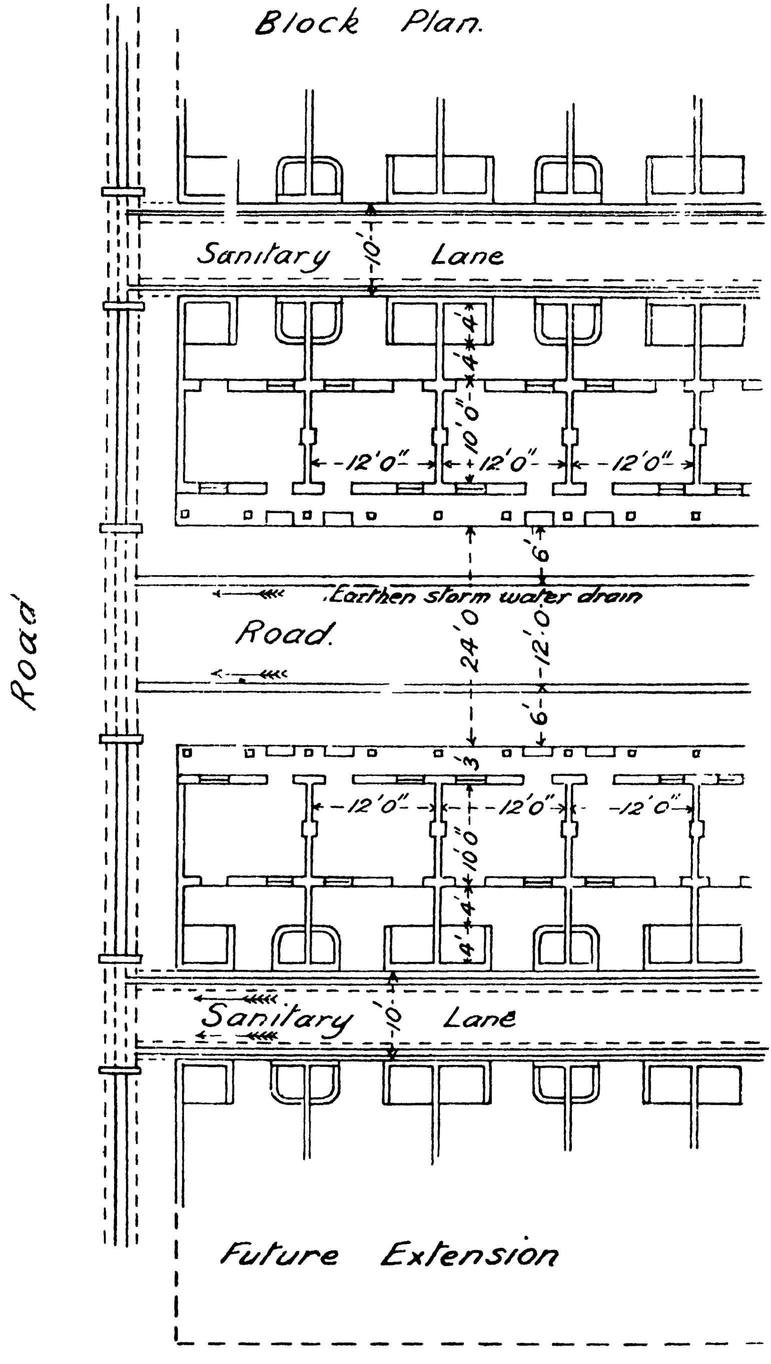
Type design No. 153 (Madras
Sanitary Board; 1914).



Section on A–A.

Design for Scavengers' huts.

Type design No. 153 (Madras Sanitary Board ; 1914).



and floors. Hollow concrete blocks were used only for interior partition walls and as such carried no part of the building load. The indications are that, aside from being a more durable and safer form of construction, this design is cheaper than the all-block plaster and stucco system.

"As stated in last year's report, the use of hard finished white plaster was considered less satisfactory than plain cement plaster painted, and was therefore abandoned. The interior of all concrete buildings constructed during the fiscal year were finished in cement, the surface treated chemically and painted in colours most suitable. Experience indicates that such a wall is less expensive in first cost and maintenance, and, due to its hardness, more serviceable.

"The use of corrugated iron for roofs of frame buildings has been standard on the Isthmus from the beginning of canal operations. For temporary frame buildings that may be subject to removal and re-erection, this material is without doubt the most satisfactory, but for buildings of a semipermanent character, designed to stand during the life of the frame, 12 to 15 years at least, corrugated iron is not so satisfactory in that it is a source of expense for upkeep, is unsightly, and deteriorates rapidly. This latter is particularly true when it is exposed to the salt air, as along the Cristobel and Colon beach. Considerable thought has been given to this question, and in an endeavour to find some substitute several different classes of roofing material have been tried, viz., asbestos cement shingles, corrugated asbestos cement board, and asphalt shingles. The first two materials meet the durability requirements and eliminate the cost of maintenance, but they are not pleasing in appearance and are high in first cost. The red asphalt shingle was placed on two buildings in January, 1916, for trial. Certain special experiments were also made with the shingle, and the results seem to indicate that it is entirely satisfactory for frame building roofs, subject to the climatic and other special conditions obtaining on the Isthmus. Further, at the present market price of corrugated iron, the asphalt shingle, together with its supporting sheathing, is approximately $5 per square cheaper than the iron, and at the price of iron before the war the costs are approximately equal, considering the current shingle price. Accordingly, authority was given to adopt the red asphalt shingle for all frame buildings to be constructed during the year 1916.

"The manufacture of hollow concrete blocks was continued at the Corozal block plant until December, 1915, at which time it was closed down. The change in design of concrete buildings eliminated the necessity for blocks in larger sizes than 3 by 12 inches and 4 by 12 inches, and arrangements were therefore made to consolidate and reduce the size of the plant."

ALL-STEEL RAILWAY CARRIAGES.

It should be possible to standardize railway carriages built of steel and export them complete. In certain areas, this would imply the possession of carriages cheaper than those made of wood locally. But the idea of thrusting passengers into steel carriages in a tropical sun is not inviting. *Indian Engineering* (Calcutta)* however (quoting *The Engineer*) proves that this aspect of the matter can be overcome by judicious treatment. The following extracts show how difficulties have been met:—

"They were designed and built by the Leeds Forge Company, Limited, under the supervision of Messrs. Rendel, Palmer and Tritton, Consulting Engineers. They measure 61 feet 9 inch over end pillars, 9 feet 6 inch over side pillars and 12 feet 10¼ inch from rail to top of roof sticks ; bogie truck centres are 41 feet 2 inch apart. The steel panels used are hydraulically stretched, cold rolled and close annealed, and all rivet heads have been countersunk and finished flush; and the general appearance has been made to conform to that of the wooden coaches now in use on the railway. Each coach is in three compartments, one for Europeans, one for Indian women, and one for the general public, each compartment being provided with its own lavatory. Seating accommodation is for 122 passengers and weight 32½ tons, this weight being nearly a ton less than if a timber body had been provided. The bogie trucks are of Indian State Railway pattern with 11 feet wheel base. The inner lining of the body is of asbestos protected by steel, the free air spaces between the inner and outer sheeting and the roof being independently ventilated in order to add to the insulation. The asbestos is specially made to withstand the effects of the Indian monsoon. The floor is of ⅛ inch steel plate covered with special keying plates for holding the decolite cement which forms the finished floor covering. . . . The Leeds Forge Company claim that . . . these five coaches have proved to be cheaper than wooden ones while they also have an advantage in cost of maintenance. To minimise corrosion the material has been separately treated and stoved before being put together and precautions have been taken to prevent undrained moisture from collecting at any point. In construction care was taken to fit the parts very accurately as the carriages had to be sent to India in sections and rivetted up at destination."

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* 1916. Dec 30. Vol. 60. No. 27. p. 428.

VITAL STATISTICS.

JAILS.—PUNJAB.

Tuberculosis.—This has been in the past a serious factor in the mortality of jails in the Punjab. Major WARD, I.M.S., Inspector General of Prisons, in his Annual Report for 1915 (p. 18) thus alludes to the subject:—

> "Two hundred and ninety-six admissions with 73 deaths are recorded, against 374 and 111 in 1914. The admission rate, therefore, fell from 27·75 to 20·16, and death-rate from 8·24 to 4·97 *per mille*.
>
> "This is very satisfactory and is, I hope, more than incidental. Great efforts have been made to overcome this terrible scourge, and, judging by the figures, with some success. The recent opening of the Shahpur Jail for the special treatment and segregation of prisoners suffering from this disease will, I feel sure, cause further improvement.
>
> "*Pneumonia.*—Pneumonia was prevalent throughout the province, and in many towns was in epidemic form. Jails, unfortunately, suffered with the rest and admissions rose to 515 with 109 deaths, from 288 and 51 in 1914."

At page 3 of the Review of the Report by the Punjab Government, the science of disease prevention, as practised under Major Ward's administration, is thus deservedly recognised:—

> "A high tribute to the improved sanitary conditions in the jails is furnished by the fact that in a year in which plague carried off nearly 200,000 persons or one per cent of the free population and cholera was widely diffused over the Province, there were only two deaths from plague and none from cholera among the jail population"

BOOK REVIEWS.

DELGADO PALACIOS (G.). **Chimie Pathologique Tropicale de la Région Atlantique.** — viii + 318 pp. With 3 coloured plates. 1914. Caracas: Lit. y Tip. del Comercio. [Price 12 fr.]

The larger animals and plants, things easily seen, have their monographs and historians of Geographical distribution. In almost every important text-book of Zoology and Botany will, also, be found a section devoted to that branch of evolutionary study: but a complete work on the geographical distribution of the unseen and microscopic creatures, protozoa and bacteria, intimately related to the diseases of humanity is yet to be written. Isolated essays on regional pathology exist, no doubt, but no one, as yet, has dealt with the subject in its entirety. Take, for example, an "up-to-date" work like E. R. STITT'S "Bacteriology, Blood Work and Animal Parasitology." (4th Edn. 1916.) It is crammed with information, literally from cover to cover, but of the geographical distribution of disease not a word! In the work now under review Dr. Delgado Palacios records the results of careful investigation of the intestinal flora of the "tropical Atlantic region." His experiments go to prove that it differs from the same flora as found in the temperate zone. With and, partly as a consequence of the variation, the composition of the faecal sediment is different: pigments, derived from the bile colouring matters, differ in chemical reactions and in properties. He has discovered a new Micrococcus and a new fatty acid in the faeces, not hitherto described, and not found in the faeces of dwellers in the temperate zone.

No attempt will be made in this brief review to describe in detail the numerous chemical experiments, the careful bacteriological investigations and the spectroscopic details which crowd the 312 pages of Professor Delgado Palacios' book. The following rough outline of his findings will suffice to attract immediate attention to his new and important discoveries.

At odd times during previous years and throughout 1913 Dr. Delgado Palacios devoted himself to special research dealing with the intestinal flora of the Atlantic tropical region. Lying here and there on, and within the faeces of native dwellers in that region, in healthy persons, but more especially in patients suffering from gastro-intestinal troubles and dyspepsias due to fermentation, he noticed little chestnut-brown specks, like powdered tobacco in colour and appearance. On carefully washing the faecal matter this intestinal "sand," grit or granule, could be collected in large amount. This granular sediment Dr. Palacios calls "Carcoma." It is composed as follows:—

"Organic matter	89·4 per cent.
Lime (CaO)	6·2 ,, ,,
Carbonic, phosphoric acids and iron	4·4 ,, ,,

The organic matter consists of: -

"Urobilinogen	27·8 per cent
Choleryrthrogen	51·3 ,, ,,
Organic stroma [including bacteria]	10·3 ,, ,, "

Having described new colouring matters recovered from "Carcoma" and from urine, such as "Cholerythrin," "pseudo-urobilin-B" and "pseudo-urobilin-γ," etc., the author reviews the rôle played by Calcium salts in the colon and in the body generally, both in health and disease. A new fatty acid, "lipopectic" acid, is described as partly taking the place of certain fatty acids commonly found in the temperate zone. From page 291 to page 298 we find a record of "Intestinal bacterial life in the tropics," with a full and detailed description of a Micrococcus peculiar (?) to the Western tropical region: *M. oxycyanogenes.*

Finally the influence of all these foregoing conditions on the diseases of Venezuela and the tropical Atlantic coasts is discussed.

Dr. Delgado Palacios notes that in diabetes "coma" is almost unknown in his part of the world. This freedom he ascribes partly to the presence of "lipopectic" acid, and to the absence from faeces and urine of the harmful aceto-acetic acid and β-oxybutyric acid, present in serious cases of diabetes in the temperate zone. The author refers to Rickets and other diseases common in one part of the world, unknown in others As a matter of interest and comparison the reviewer can state as the outcome of fairly long experience that "Yellow fever," "Diabetic coma" and "Rheumatic fever" are almost if not quite unknown among the native races of India. "Rickets," moreover, is so rare in Indian children that one may say that it does not occur. In this opinion the reviewer is supported by Major C. A. SPRAWSON, I.M.S., who writing about the diseases of children in India says: "Rickets is one of the commonest diseases of infants, especially common in England. It is not nearly so common in India."

Although not claiming originality in so many words Dr. Delgado Palacios places the following conclusion in italic type:—

"*Faecal re-absorption is the origin of many diseases that have been considered as primary defects in nutrition, for example, osteomalacia and rickets.*"

It is evident that the author is not acquainted with the theories and practical work of ARBUTHNOT LANE, and others in France, England and America. LANE started his theory of faecal intoxication as the cause of many diseases somewhere about 1901. In later years he found that he had been forestalled by the work of METCHNIKOFF and in his book (Colotomy as a cure for chronic constipation and its consequences), published in 1909, LANE placed "priority" where it was due. LANE and his followers treated the intestinal fauna and flora as a gardener treats weeds, rooting them out. The very reception of LANE's views showed how ignorant most medical men were of "Colonic" botany. By one gentleman (in a "Cavendish" lecture) ARBUTHNOT LANE was compared to ERNEST LANE and his writings to the latter's translation of the "Arabian Nights."

In spite of numerous typographical errors, a somewhat involved style and much unnecessary repetition, Dr. Delgado Palacios' work is new and important. It is his earnest desire that others should repeat and criticise his researches. Such work could be done in Trinidad and British Guiana where the same material could be obtained and the Professor's results confirmed or confuted. Similar investigations should be made in Egypt and India so that East can be compared with West. As far as the temperate zones are concerned data will be found in the writings of HERTER, HALLIBURTON, etc., and for temperate North America in A. P. MATHEWS' "Physiological Chemistry," 1916.

Dr. Delgado Palacios received from the President of the Republic a civil pension, and with a well furnished laboratory and skilled assistance he was able to devote his whole time, during 1913, to his new and interesting research work.

J. H. Tull Walsh.

STOTT (Hugh), [M.B., B.S. (Lond.), Capt. I.M.S.]. **Studies in Malaria. In Five Parts.**—xii + 190 pp. With 18 plates & 50 charts. 1916. Calcutta and Simla: Thacker, Spink & Co. [Price Rs. 7/8.]

This is a book of about 200 pages in five parts of three chapters each with 18 plates and 50 charts. The author deserves congratulation for attempting to solve various disputed questions and to add to our knowledge of facts instead of making an ordinary contribution to the lumber-heap of text books.

The fundamental defect of the work is that the presentation of facts is incomplete; almost throughout we have presented to us malaria cases and not malaria parasites. Thus on p. 55 over 1,000 cases of malaria are classified as intermittent, remittent, etc., but there is no record of the species of parasites in these cases. A "malaria case" is a clinical entity and so leaves room for doubt. A correct parasitic record is an established fact, and if we start from this ascertained basis we know with certainty the nature of the material we are using.

Part I is devoted to the malaria prevailing in Fort Dufferin, Mandalay, and attempts to explain the respective influences of quinine prophylaxis, net prophylaxis and anti-larval measures respectively in reducing the malaria in the various populations in the fort.

The anti-larval measures cannot be understood here without reference to the plan of the fort. An appreciation of these anti-larval measures per se would have been easier if the author had given two plans showing the larval distribution before and after operations, and confirmatory evidence should have been similarly afforded as to the numbers of anophelines in the various quarters and still more completely by a record of the sporozoite rate in the anophelines before and after. The experiment is somewhat complicated also by the fact that some of the populations were subject to the influence of more than one factor, e.g., quinine and anti-larval measures at the same time. The figures for the various groups given are admission rates for malaria. The author concludes that anti-larval measures were unexpectedly successful and that prophylactic quinine was of no value.

The vexed question of the prophylactic value of quinine is the subject of an experiment described in Part II. It is not quite correct however to use the term prophylactic, as the population experimented upon was already an infected one. Strictly used prophylaxis should apply to an uninfected population. The experiment lasted nearly a year. As shown in the following table, four companies of a regiment (the 91st Punjabis) were given quinine, four were not. The prophylactic dose was grains 15 thrice weekly for five months (none for two months when the regiment was in the hills) and grains 10 thrice weekly for nearly six months.

Oct. 1911 to Sept. 1912.	Total strength.	Total Fever Admissions.	Rate per 1,000 strength.	Primary Admissions.	Rate per 1,000 strength.
Cos. A.C.E.G. (taking quinine) ..	3,931	259	65·8	170	43·2
Cos. B.D.F.H. (not taking quinine ..	3,906	265	67·8	179	45·8

The difference in favor of the quinine takers is negligible. If these results are reliable they are important. Two points may be raised. Did the "quinine takers" take their quinine? The author himself only saw taken 10 per cent. of the doses, i.e., less than 1 out of 12 monthly doses. Was it malaria the author was dealing with? In all probability it was, for when admitted to hospital the cases were amenable to quinine treatment, but this is not absolute proof and it should have been stated in how many parasites were found. This constantly recurring question of quinine prophylaxis should be determined once and for all by strictly conducted experiments on bodies of troops or jail prisoners, with all conditions subject to exact determination, accompanied by microscopical examinations with adequate controls.

In Part IV, which is mainly clinical, the most valuable parts are those in which the question of relapses is considered. Here also the lack of parasitic information is unfortunate. We do not know whether we are dealing with simple tertian or malignant tertian malaria, which behave very differently in respect to relapses, very possibly from the fact that simple tertian gametes practically invariably accompany the acute attack while crescents follow after an interval. But to consider the data given.

***The curative treatment* adopted was grains 10 thrice daily until the fever had subsided (on an average in two days) and then grains 10 four times a week for four months. On this treatment, there were among 347 men, 121 primary relapses, i.e., about ⅓, about ⅔ being cured. But from this one should deduct 18 per cent. who "recovered" without any quinine (p. 103) leaving about 44 per cent. cured by the quinine**

course. Nearly half the *readmissions* took place within a month, 75 per cent. within four months, that is to say while they were undergoing *a curative course of quinine.* This is a somewhat suspicious occurrence and makes one rather hesitate to accept the result. One's own experience of simple tertian malaria is that cases do certainly relapse *during* a course of curative quinine but that the figure should reach 75 per cent. of readmissions scarcely seems credible. One can only ask again, was the quinine actually taken? And further as no distinction is made between simple tertian and malignant tertian malaria—an important omission—we do not know what the exact nature of the material is. Nor were there any controls, so that we do not know how many would have relapsed without the treatment. But still that only a quarter of the readmissions occurred after four months' treatment is an encouraging result.

Chapter IX contains an interesting contribution to the value of the mononuclear count in malaria. The author unfortunately adopts Sir Leonard Rogers' erroneous definition of the *large* mononuclear leucocyte, but we may discuss his figures from the standpoint of *total* mononuclears which are hardly beyond the competence of the tyro to enumerate. The reviewer has classified the author's 163 counts in the following way:—

Temperature.	Percentage of total mononuclears.	Average percentage.
105°	26–37	33
104°	24–49	40
103°	12–52	26
102°	11–72	34
101°	18–81	37
100°	15–52	31
99°	37–70	53
N.	14–67	35

The inference seems justifiable that the presence of a *total* mononuclear percentage of 40 per cent., if certain diseases can reasonably be excluded, is evidence of malaria but that its absence does not necessarily signify an absence of malaria infection. This is unfortunate, for it is just at the time when the blood is negative after the administration of quinine that we want to know if the patient is cured. Now, our only means of diagnosis is to wait for a relapse.

To sum up, the greater part of this book is written from a different standpoint to that of the ordinary humdrum text book which "no student should fail to read." To the worker who is not satisfied with the latter but wishes to find out the truth of things himself, this book should be suggestive, but as we have implied he must examine it critically.

J. W. W. Stephens.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 10.] 1917. [No. 2.

SLEEPING SICKNESS.

TEICHMANN (Ernst). **Mischinfektionsversuche mit Trypanosomen.** [Mixed Infection Experiments with Trypanosomes.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Nov. 23. Vol. 82. No. 3. pp. 511–525.

Reference is made to the work of LAVERAN and ROUDSKY who showed that when a strain of trypanosomes which had lost the centrosome owing to treatment with oxazine was inoculated into an animal together with the original strain, the latter died out in subinoculated animals whilst the blepharoplastless strain persisted (see *Sleeping Sickness Bulletin*, Vol. 4, p. 157); and to the somewhat similar work of OEHLER on drug-fast strains and the original strains [this *Bulletin*, Vol. 3, p. 539]. The strain which multiplies more rapidly is the more virulent and persists at the expense of the other.

The question now arises, what happens in the case of a mixed infection of two or more strains which are not to be differentiated as regards rapidity of multiplication and pathogenicity. It is this question which the author endeavours to answer. Equal amounts of, as far as possible, equally strong suspensions of two virulent nagana strains (Strain 4 and Strain 90F1) were mixed together and injected into a number of mice; subsequently by subinoculation the mixed strain was carried through a long series of mice. The trypanosomes after various passages were examined by injecting into mice which had previously received ½ cc. of serum immune to one or other or both of the parent strains.

The following summary is given of the results obtained:—

1. In mixed infections with two equally virulent nagana strains the components become separated in the course of a few passages through mice.
2. The disintegration can occur through the suppression of one or the other of the two components.
3. Differences of sensibility of the components to arsacetin exert no definite influence on the direction in which the disintegration proceeds.
4. The disintegration of two equally virulent acute nagana strains is also not prevented if the heart blood of the mixed infected mice be employed for inoculation.
5. In mixed infections of trypanosome strains producing chronic disease in mice (*T. brucei* and *T. congolense*) a separation of the components does not take place in consequence of the remissions which occur.
6. Exceptionally disintegration can take place when one of the components is transmitted further by inoculation.

W. Yorke.

Kolmer (John A.), Schamberg (Jay F.) & Raiziss (George D.).
i. **Various Methods for Determining the Trypanocidal Activity of Substances *in vitro* and their Relation to the Chemotherapy of Experimental Trypanosomiasis.**—*Jl. Infect. Dis.* 1917. Jan. Vol. 20. No. 1. pp. 10–27.
ii. **The Numeric Relationship of Infection to the Chemotherapy of Experimental Trypanosomiasis.**—*Ibid.* pp. 35–44.

i. With the object of devising a technique for determining the parasiticidal activity of a drug independent of its toxicity upon the host various methods of examining the trypanocidal activity of substances *in vitro* were studied.

In the earlier experiments described in this paper equal drops of a suspension of living trypanosomes (*T. equiperdum*) and of various dilutions of the chemical to be examined were mixed on a coverslip, which was then inverted over a concave slide and the preparation sealed with vaseline; the preparations were kept at 37° C. and observed microscopically for periods up to one hour. By this means the trypanocidal activity of various dilutions of emetin, mercuric chloride and arsenobenzol were tested *in vitro*. In later experiments the trypanosomes were subjected to the action of the chemicals for a certain time and then after removal and washing of the parasites by centrifugation they were injected into the peritoneal cavities of white rats.

Finally in what is called the "combined *in-vitro-vivo* method" equal parts of varying dilutions of the chemical under study were mixed with the trypanosome suspension and after keeping at 37° C. the whole or a part was injected intraperitoneally into rats. The action of the drug in this case is both *in vitro* and *in vivo* and care must be exercised against the administration of lethal doses of the drug.

Details of the technique adopted in these three series of experiments are given and the results obtained are set forth in tables.

The conclusions are:—

"Trypanocidal tests *in vitro* have been found of distinct value in chemotherapeutic researches in experimental trypanosomiasis.

"Substances exerting a profound trypanocidal activity *in vitro* are likely to prove trypanocidal *in vivo*, provided the drug is sufficiently nontoxic to be administered in adequate dosage.

"With the combined *in-vitro-vivo* method described herein, it has been found possible to detect the trypanocidal activity of new compounds which were without effect *in vivo* in amounts but slightly less than the sublethal dose.

"By the methods described herein arsenobenzol, or salvarsan, has been shown to possess a high trypanocidal activity *in vitro*.

"*In-vitro* methods have also demonstrated a trypanocidal activity on the part of mercurials which is not apparent in the *in-vivo* tests."

ii. Kolmer has shown that the parasitropic effects of a drug and the resistance of the animal to the drug's organotropic effects are apparently modified, to some extent at least, by the number (large or small) of trypanosomes with which the animal is infected [this *Bulletin*, Vol. 6, p. 380]. In the present paper are recorded experiments bearing upon the numeric relationship of infection to the chemotherapy of experimental trypanosomiasis.

A series of rats were infected with a uniform number of *T. equiperdum* 24 hours before the drug was administered intravenously in doses according to the body weight of each animal. The number of trypanosomes inoculated intraperitoneally was 100,000 to 150,000 per rat: parasites were not usually found in the peripheral blood until 48 hours after inoculation or 24 hours after treatment. By this procedure the infection is given a 24 hours start, and is heavy enough to infect the control in every instance, yet light enough not to mask finer degrees of therapeutic effect on the part of the drug under investigation.

Experimental details are given and the results set forth in a series of tables. The conclusions are :—

"These experiments demonstrate that in the chemotherapy of trypanosomiasis there is an important relationship between the number of trypanosomes injected into the test animal and the trypanocidal activity on the part of the drug.

"This relationship is particularly in evidence with respect to the amount of drug necessary to effect complete sterilization; while rats infected with 500,000 trypanosomes may be sterilized with 0·001 gm. of arsenobenzol per 100 gm. of rat, this is not the case when larger numbers of trypanosomes are injected.

"The influence of numbers is less marked when the rats are very heavily infected, as with numbers over 2,000,000. In these instances, arsenobenzol or salvarsan in dose of 0·001 gm. or 0·6 gm. per 60 kilograms of body weight retards the appearance of trypanosomes in the peripheral blood, but does not sterilize. The time of appearance of the parasites in the blood is likewise not greatly influenced by variation in the number used in inoculation.

"The numeric relationship of infection to the results of chemotherapeutic experiments is therefore a subject of considerable importance, and more particularly in comparative tests."

W. Y.

Marty (L.). **Agglutination et désagglutination des globules rouges dans la trypanosomiase.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 392–398.

In a moderate sized drop of normal blood the red corpuscles lie in rouleaux: these are 10–50μ long and are disposed in a variety of ways. There is contact of corpuscle with corpuscle without compression. The corpuscles are all of the same degree of colour, uniformly greenish yellow. When the drop is too thick the red cells are superimposed with alternation of colour from greenish yellow to copper.

In blood infected with trypanosomes the appearance is quite different. Macroscopically a preparation of normal blood appears finely granular and the general colour is pale except at the periphery at the level of the lute. At the point of contact with the air the blood coagulates and forms a continuous haemo-lute which prevents too rapid evaporation. In blood infected with trypanosomes the preparation becomes rapidly granular, the grains being very large. The preparation instead of being pale is smoky red. Between these two types all intermediate stages may be found: in doubtful cases microscopical examination with obj. 7 or the oil immersion lens is necessary.

If after 5 to 10 minutes pressure is applied, with a glass rod or with the finger nail, at the centre of the coverslip and then towards the periphery, the granular appearance is lost in the preparation of normal blood and does not return, but in the trypanosome blood it reappears. If the operation is repeated after 15 minutes the granular appearance still reappears. At the end of an hour the granular appearance is transformed into one of reddish sand which persists for several hours.

The phenomenon was observed under the microscope. In normal blood the red cells, which at the periphery lie touching one another, become crenated and haemolysed, and thus form a lute (haemo-lute) capable of protecting fairly well the rest of the preparation from contact with the air. As, however, this protection is merely relative crenation extends to all the corpuscles in the preparation. Finally there results an unformed deliquium invaded by bubbles of air according to the degree in which the plasma evaporates. From time to time corpuscles are encountered which resist crenation; these fragment into two or three unequal parts (globulids) which disappear finally in the general deliquium.

In blood infected with trypanosomes the red corpuscles at the periphery of the preparation become drawn out and flattened in layers and maintain for a long time their individuality. This haemo-lute is much more protective than that of normal blood. From the deeper surface of the stratum certain prolongations become detached. If a bubble of air strays into the stratum it is immediately encysted by red cells which become disposed around it. Later when evaporation reaches a certain stage the covering stratum loses its continuity and becoming dislodged floats about in the serum as flexible bands of a lemon yellow colour. The deepest glide gently amongst the obstacles without disintegrating and reach the central regions. This suppleness and ability to move without loosing the corpuscles is characteristic of an agglutinat in its most perfect form.

Behind this covering stratum are found agglutinats of less importance. They diminish in number and volume from the periphery to the centre of the preparation.

What happens when the agglutinats are crushed by transient pressure on the coverslip? The red cells can be grouped into two categories: firstly those which, not having had a sufficient agglutinating power, are fragmented (globulids) and slowly become crenated; and secondly those which contribute to the formation of agglutinats. On the first application of pressure the rouleaux, compressed and irregular, become fragmented. When the pressure ceases the various fragments unite to form more voluminous agglutinats, with irregular contours and encircled by globulids. The central portion of the agglutinat is deep yellow, sometimes mahogany; the periphery which is less thick is pale yellow. The haemo-lute which was damaged by the pressure reforms but in a stratum which is less regular and not continuous; small portions of it escape towards the more central regions.

The second compression applied one quarter or half an hour later is attended by similar destruction and displacement; when it ceases the agglutinats reform irregularly. The evaporation of serum is accelerated. The red cells in order to escape dessication shrink and become more tightly packed; they become heaped up.

A third compression half an hour later accentuates the packing and the shrinking of the agglutinats. A little later vacuolisation of the agglutinat is observed. Finally the massing of the red corpuscles into agglutinats is no longer observable. As the adhesive power goes, the agglutinat distends and undergoes granular degeneration, and becomes hardly recognisable.

The author points out that the drop of blood in which these phenomena can be best observed is that which after light pressure only occupies two-thirds or three-quarters of the coverslip. Drops too large or too small must be rejected.

The phenomenon of "agglutination-disagglutination" was not observed in syphilis, yaws, malaria or bilious haemoglobinuric fever.

W. Y.

YAKIMOFF (W. L.) & WASSILEVSKY (W. J.). **Essais biologiques sur le luargol (102 de Danysz). Traitement de la dourine expérimentale des souris.**—*C.R. Soc. Biol.* 1917. Apr. 21. Vol. 80. No. 8. pp. 387–388.

The authors examined the effect of injecting luargol and also its disodic compound into healthy mice and mice infected with the Russian strain of dourine. It was found that 1 c.c. of 1 in 200 or 1 in 250 solution injected into the vein of the tail killed healthy mice in a couple of days but that these animals survived the same volume of weaker solutions (1 in 300 to 1 in 800). The lethal dose is therefore 4 mgm. per mouse of 20 gm.; the largest dose tolerated is 3·3 mgm. per mouse of 20 gm. The fact that death was delayed for two days after injection of a lethal dose indicates that this product is less toxic than arsenobenzol of German or, more especially, of Russian manufacture.

Solutions of 1 in 600 to 1 in 900 cured dourine infected mice, there being no relapse within an observation period of 60 days. After injection of weaker solutions relapses occurred. The therapeutic dose is therefore 1 c.c. of a 1 in 900 solution or 1·1 mgm. The therapeutic index (the ratio of the curative dose to that tolerated) is 1 : 3, which is superior to that of salversan.

The conclusion is that the substance 102 of Danysz (luargol) is a very good chemotherapeutic product.

W. Y.

SCHUSCHA (A. T.). **Ueber die Wirkung von Emetinum hydrochloricum auf Trypanosomen.** [The Action of Emetine Hydrochloride on Trypanosomes.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. **Mar. 31.** Vol. 79. No. 4. pp. 180–183. With 1 plate.

In mice subcutaneous injections of emetine hydrochloride, in doses of ·001 gm., exert a slight protective action against infection with *T. equiperdum*. The toxic dose of the drug for mice is about ·002 gm. but ·001 gm. can be given on each of two consecutive days without fatal results. Emetine hydrochloride has no curative value.

W. Y.

RIECKENBERG (H.). **Eine neue Immunitätsreaktion bei experimenteller Trypanosomen-Infektion: die Blutplättchenprobe.** [A New Immunity Reaction in Experimental Trypanosomiasis: the Blood Platelet Test.]—*Zeitschr. f. Immunitätsforsch.* 1. Teil. Orig. 1917. Vol. 26. No. 1. pp. 53–64.

If the blood of a rat which has been cured of nagana be mixed with citrated bouillon before clotting has occurred, and if trypanosomes of the parent strain be added to this, after the lapse of a few minutes the trypanosomes are found to be loaded with masses of blood platelets which impede the movement of the parasites. The author points out that there is no reference to this phenomenon in the literature.

By the following procedure the appearance was well seen. Rats were infected with a mouse-passage strain of nagana (Prowazek) and when numerous parasites appeared in the blood were cured with tartar emetic, arsenophenylglycin, trioxide, etc. Three or four days after the cure one drop of the rat's blood was mixed on a slide with one drop of citrated bouillon (2 per cent. sodium citrate to a faintly alkaline ordinary bouillon), whereby clotting was prevented ; trypanosomes of the parent strain were then added, well mixed with the rat's blood, and covered with a slip. On examining (Zeiss D.D. Oc. 4) immediately after preparation the trypanosomes were found to be actively motile *in situ* but to have lost their power of translatory movement. After a few minutes the trypanosomes, if they were numerous, were found to be agglomerated : and furthermore blood platelets became adherent to the trypanosomes. This is as a rule well marked in 15–20 minutes.

It is essential for the reaction that coagulation of the blood of the immune animal be prevented ; the serum of an immune animal will not give the blood platelet reaction, although it causes the agglomeration reaction. From various observations the author concludes that for the obtaining of the blood platelet reaction some factor other than that causing agglomeration of the trypanosomes is necessary.

The blood platelets observed in the experiment described above have two sources of origin, firstly the blood of the immunised animal and, secondly, that of the animal supplying the trypanosomes. As the reaction does not occur when the blood platelets of the animal furnishing the trypanosomes and immune serum are used it follows that those adhering to the trypanosomes must be derived from the immune animal.

The reaction was obtained with five different strains of trypanosomes: (1) Old Hamburg strain, (2) Prowazek strain, 3) a strain passed through *G. morsitans* by SCHILLING and then carried on in rats, (4) Siena strain—probably nagana Ferox, (5) a strain of Gnu XII from Daressalam). The reaction was obtained with rats, guinea-pigs and rabbits ; it is strongly specific and not a group reaction ; e.g., it does not occur with the blood of an animal immunised to the Prowazek strain on the one hand and with trypanosomes of the Hamburg strain on the other.

The following are the conclusions :—

In the blood of experimental animals cured of, or chronically infected with, trypanosomiasis are bodies of such a nature that they cause the trypanosomes of a rat or mouse in a citrated blood suspension of this animal to become laden with blood platelets.

The phenomenon is strongly specific and is only observed when the homologous trypanosome strain is employed.

By means of this reaction the parent strain can be distinguished from the relapse strain. The reaction appears in all those cases in which an immunity against reinfection exists.

W. Y.

Novy (F. G.), de Kruif (P. H.) & Novy (R. L.). **Anaphylatoxin and Anaphylaxis. I. Trypanosome Anaphylatoxin.**—*Jl. Infect. Dis.* 1917. May. Vol. 20. No. 5. pp. 499–535. With 1 fig. & 2 charts.

The authors summarise the work described in this paper as follows:—

"Anaphylatoxin was produced by 5 different trypanosomes, including the nonpathogenic *T. lewisi*.

"It is made not only by the living cells, but also by the dead, more or less autolyzed, cells, and even by such when heated to 60° C.

"The same mass of trypanosomes can be used repeatedly to toxify different lots of serum without apparently any limit to their inducing power. This serial production in one experiment extending over eight days, was carried through 20 tests with no indication that the organisms were weaker than at the beginning.

"Rat serum is preferable to guinea-pig serum since it yields a poison which may be 12 or more times as active as that obtained with the latter; the respective lethal doses being 0·25 cc. of the former and 3 of the latter.

"The speed of poison-production under favorable conditions is very rapid and quickly reaches a maximum, the poison then persisting for a long time. Thus, infected defibrinated rat blood or serum, when incubated for 1 or 2 minutes, may become fatally toxic. With an incubation of about 15 minutes, it is possible to produce a toxic serum such that 0·25 cc. will cause acute anaphylactic death.

"Sera inactivated at 56° C. or 60° C. for half an hour apparently can be toxified.

"The anaphylatoxin was found to persist at 37° C. for more than four hours; at about 0° C. it may persist for an indefinite time. Thus, a surra serum was still toxic after icing for 171 days; a nagana serum was likewise active for 35 days. Attempts at detoxifying by addition of normal serum, bile, or cholesterin resulted negatively.

"Toxic sera can induce toxicity in normal sera, the mixtures representing a high dilution of the former. This result is not due to the action of a ferment, but to minute amounts of trypanosomes still present in the inciting serum; or, in the case of very prolonged incubation, to the production of autoanaphylatoxin.

"A comparison of the effects of different centrifugation-rates on chilled, rapidly defibrinated blood shows that sera obtained at slow speed readily become toxic; the sera secured at a very high speed do not.

"Transfusion experiments indicate the possible presence of anaphylatoxin in heavily infected rats. The formation of this poison in corpore may lead to sudden deaths or to chronic intoxication or cachexia.

"The injection of normal rat serum into infected guinea-pigs does not result in the in-vivo production of poison; any effect observed is due to the primary toxicity or autoanaphylatoxin of such injected serum.

"The toxicity of trypanosomal sera, when tested at regular intervals, appears to show more or less oscillation. Similar variations are met with in tests with anaphylatoxins produced by other agents, and even in normal sera. They are not due to changes in the amount of poison, but to varying resistance of the test animals.

"The injection of large amounts of washed trypanosomes into guinea-pigs may result in the production of anaphylatoxin in corpore. The effects are not due directly to the organisms, but to the disturbance in the colloidal state of plasma constituents, caused by the alien material.

"The 'trypanotoxins' are therefore disturbers of equilibrium; the result is a poison-production in vivo as well as in vitro. The mode of action of endotoxins in general will be found to be of the same nature.

"The participation of a ferment in this reaction is contraindicated by the speed of production, the rapid attainment of maximal level, the behavior of inactivated sera, and by the results of centrifugation.

"The syndrome of symptoms and autopsy findings consequent on the injection of the trypanosome anaphylatoxin are those of the intoxication of true anaphylaxis. The two poisonings are to be considered as identical."

W. Y.

VELU (H.). **La Trypanosomiase des chevaux au Maroc. (Etude expérimentale).**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 253–260.

The author has examined the effect of inoculating various experimental animals (mules, dogs, rabbits, rats, sheep and goats) with the trypanosome causing disease in Moroccan horses. The parasite in question was named *T. marocanum* by SERGENT, LHERITIER and BELLEVAL [see this *Bulletin*, Vol. 6, p. 376]. Details of the experiments are given in tables.

White rats.—The disease ran an acute course of 7 to 10 days. The spleen was found to be enormously hypertrophied at death.

Rabbits.—In these animals the infection was chronic and progressed slowly and irregularly.

Dogs.—The infection was subacute with frequent febrile disturbances; trypanosomes were present almost constantly in the blood.

Mules.—The duration of the disease in two of these animals was respectively 68 and 98 days, and the incubation period after intravenous inoculation 9 and 5 days. Oedemas were not observed, but, as in horses, watering of the eyes was a constant symptom. One of the animals exhibited, towards the end of the disease, locomotor disturbances and finally paraplegia.

Goats and sheep.—Two goats and two sheep were inoculated. Trypanosomes were never found in the blood, nor was there any fever or emaciation.

W. Y.

GREGGIO (G.). **Trypanose des porcs ; relations des porcs avec la trypanose humaine dans la vallée de l'Inkissi (Moyen Congo belge).**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 113–117.

In the valley of the Inkissi (Belgian Congo) 36 of 94 pigs examined were found to be infected with *T. congolense*; the investigation was made between May and November, 1914. As the trypanosomes in the blood were very scanty, probably the proportion of infected animals was much higher than this, four films (two fresh and two stained) being examined. The infection did not produce symptoms, the animals multiplying normally and being in excellent condition.

Although there is no direct relationship between human trypanosomiasis and that of the pig these animals indirectly increase the risk to human beings. The pigs, which are a constant and easy source of food for Glossina, enter and leave the village at will and carry the tsetse with them, especially *G. palpalis*.

Reference is made to the close association which exists in Principe between pigs and *G. palpalis*.

W. Y.

GREGGIO (G.). **Note sur la lutte contre la trypanose à Kisantu (Congo Belge). Résultats et espérances.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 398–406.

Human trypanosomiasis made its appearance in the Kisantu district for the first time in 1900, and in less than ten years it had swept away two-thirds of the population. In some centres even nine-tenths of the inhabitants had disappeared and only an occasional survivor remained to bear witness to the existence of a village.

The author relates the difficulties which had to be surmounted in dealing with the epidemic. The natives were apathetic and the hospital was a cause of terror to the sick ; superstitition, prejudices and opposition of all kinds had to be overcome.

During the past few years the state of affairs has undergone a marked improvement. A table shows the retrogression of the disease since 1912. In that year 680 natives were examined and 32 (4·7 per cent.) found to be infected, in 1915 of 2,730 persons examined only 20 (·7 per cent.) were infected. The natives now regard medical examination with favour. The birth rate is increasing.

A brief account is given of the measures which have brought about this change for the better. Stress is laid upon education of the native, treatment of the sick, relief from taxation for those monogamous households containing four living children and other methods of protecting infant life.

W. Y.

VALLADARES (Prado). **Polyorrhomenose e cruzi-trypanose.** [Polyorrhomenosis and Cruzi-Trypanosis.]—*Brazil Medico.* 1916. Nov. 11. Vol. 30. No. 46. pp. 362–364.

PICCHINI has suggested the term *Polyorrhomenitis* for the associated, or successive, inflammations of the serous cavities on both sides of the diaphragm (Graecè, ôrròs = serum), which occur in Chagas' disease. The author of the present paper thinks that "Polyorrhomenosis" would be the more correct term. He also proposes the name of "Cruzi-Trypanosis" for Chagas' disease.

J. B. Nias.

KALA AZAR.

Rogers (Leonard). Chronic Splenomegaly in Lower Bengal with Special Reference to the Prevalence and Clinical Differentiation of Kala-Azar.—*Indian Med. Gaz.* 1917. Jan. Vol. 52. No. 1. pp. 7–15.

The investigation of which this paper embodies the result was undertaken with a view to establish simple clinical rules (in the absence of facilities for spleen puncture) for differentiation between splenomegaly due to kala azar and that due, especially, to chronic malaria in Lower Bengal. (As to whether splenic anaemia, or Banti's disease occurs in Lower Bengal, it is not possible to give a definite answer). The cases investigated numbered 166. In all, blood counts were made by the author personally while in every instance spleen puncture was performed. It was found that 66 of the total number harboured leishmania.

In his introductory remarks the author points out that spleen puncture is contraindicated in the presence of ascites, great anaemia (less than 1¼ million red cells), strong tendency to haemorrhages from nose, gums, etc., jaundice, or serious complications such as pneumonia. When puncture has been decided upon 20 grs. of calcium lactate should be given on the previous evening and repeated shortly before the puncture. As fine a needle as is consistent with the necessary strength should be used. Pressure with pad and bandage is applied immediately after the operation and the patient kept recumbent for 24 hours. With regard to liver puncture it is pointed out that the parasites are less readily found by this means, so that more cases will be overlooked if it is relied on. It is mentioned that a death has occurred following this procedure.

The paper contains the following tables which give the gist of the matter and illustrate the various points discussed:—

Table I.

Splenomegaly Cases with and without Kala Azar Parasites classified according to the Degree of Leucopenia.

Ratio of White to Red Corpuscles.	With Kala Azar Parasites.			Without Parasites.	
	No.	Percentage.		No. and Percentage	
—1 to 1,500	33	50·0	80·3	18	43
+1 „ 1,500 —1 „ 1,000	20	30·3		25	
+1 „ 1,000 —1 „ 500	10	15·5	19·7	43	57
+1 „ 500	3	4·2		14	
Total	66				100
Percentage	39·8				60·2

TABLE II.

Geographical Distribution of the Cases.

——	Kala-Azar Cases.		Negative Cases.
	No.	Percentage.	No. and Percentage.
Calcutta	24	36·4	10
Bengal :—			
Presidency Division ..	12	18·2	29
Burdwan Division ..	11	16·6	38
Dacca Division	1	1·5	3
Chittagong Division ..	..	.. ..	2
Rajshahi Division ..	6	9·1	7
Biher	6	9·1	1
Orissa	1	1·5	4
Chota Nagpur	..	.. ..	1
Assam	2	3 0	1
Other Provinces	3	4·5	4
Total	66		100

TABLE III.

Degree of Anaemia in Relation to the Duration of the Fever.

Duration.	To 6 months.	6 months to 1 year.	1 year to 2 years.	2 years.	Total.	Percentage
Cases with Kala Azar Parasites.						
+4,000,000	2	3	2	..	7	10·6
—4,000,000 +2,500,000	17	19	6	2	44	66·7
—2,500,000 ..	6	5	4	..	15	22·7
Total ..	25	27	12	2	66	
Cases without Kala Azar Parasites.						
4,000,000 ..	3	3	3	5	14	
—4,000,000 +2,500,000	12	18	8	21	59	
—2,500,000 ..	3	4	9	11	27	
Total ..	18	25	20	37	100	

TABLE IV.

Degree of Enlargement of the Spleen and Liver.

Spleen.	Cases with Parasites.		Cases without Parasites.
	No.	Percentage.	No. and Percentage
Above navel	12	18·2	23
To navel	20	30·3	15
To 2 below navel	30	45·5 } 51·5	50 } 62
Over 2 below navel.. ..	4	6·0 }	12 }
Total	66		100
Liver.			
Normal	18	27·3	41
—1 below ribs	16	24·2	18
1 to 2 below ribs	22	33·3	24
2 below ribs	10	15·2	17
Total	66		100

TABLE V.

Weights on Admission and the Gain or Loss of Body Weight.

Aged 18 and over.	Cases with Parasites.		Cases without Parasites.	
	No.	Percentage.	No.	Percentage.
110 lbs.	1	2·1 } 17·0	13	15·0 } 44·2
100 to 110 lbs	7	14·9 }	25	29·2 }
90 to 100 lbs.	15	31·9	20	23·3
60 to 90 lbs.	24	51·1	28	32·5
Total	47		86	
Aged under 18—				
Over 60 lbs.	8	42·1	10	71·4
50 to 60 lbs.	9	57·9	4	28·6
Total	17		14	
Lost weight	30	45·5		25
Gained weight	22	33·3		52
No change	5	7·6		4
Not re-weighed	9	13·6		19
Total	66			100

TABLE VI.

Duration of Previous Fever in Relation to Leucopenia.

Ratio of White to Red Corpuscles.	—1 to 1,500	—1 to 1,000 +1 to 1,500	—1 to 500 +1 to 1,000	+1 to 500	Total.		
Duration.	Cases with Kala Azar Parasites.				No.	Per cent.	
Under 6 months	8	3	1	2	14	21·2	60·6
Six months to under 1 year..	12	8	6	..	26	39·4	
One year to under 2 years ..	8	7	3	..	18	27·3	
Two years to under 3 years ..	3	2	..	1	6	9·1	12·1
Three years and over	2	..	..	..	2	3·0	
Total ..	33	20	10	3	66		
Percentage ..	50·0	30·3	15·2	4·5	100·0		
	Cases without Kala Azar Parasites.				No. and Percentage.		
Under 6 months	..	2	6	3	11	26	
Six months to under 1 year..	..	5	10	..	15		
One year to under 2 years ..	6	5	8	3	22		74
Two years to under 3 years ..	5	6	5	2	18	52	
Three years and over	7	7	14	6	34		
Total and percentage ..	18	25	43	14	100		

TABLE VII.

The Degree of Fever and their Variations under Treatment.

	Cases with Parasites.			Cases without Parasites.	
	No.	Percentage.		No. and Percentage.	
Remittent fever	17	25·6	80·3	10	30
Intermittent to over 100 F..	36	54·7		20	
Intermittent to 100 F. or less	12	18·2	19·7	19	70
Normal	1	1·5		51	
Total	66			100	
Variations of Fever while in Hospital.					
Increased	7	10·6	87·9	..	18
No change	31	47·0		8	
Decreased somewhat ..	20	30·3		10	
Fell to normal	7	10·6	12·1	31	82
Normal throughout.. ..	1	1·5		51	
Total	66			100	

The following are the author's conclusions:—

"1. In view of the uniform success I have obtained in the treatment of kala-azar in Europeans by tartar emetic intravenously, simple clinical rules for the differentiation of that disease from chronic malaria and other forms of splenomegaly are much to be desired, but have not hitherto been available.

"2. Spleen punctures in 166 cases of chronic splenomegaly cases in Lower Bengal have revealed the parasites of kala-azar in only 40 per cent. Of 114 cases showing fever while in hospital Leishman-Donovan bodies were found in 57 per cent. The disease was more frequently contracted in Calcutta than in rural areas as compared with chronic malaria. Beyond Calcutta, the Presidency and Burdwan Divisions are most infected with kala-azar, while the Rajshahi Division and Bihar yielded the next largest number of cases.

"3. The size of the spleen and liver, the degree of anaemia, and the seasonal incidence of the admissions afford no material help in distinguishing between kala-azar and chronic malaria, which have been so hopelessly confused for the last century in Eastern India.

"4. Great leucopenia, such as less than one white to 1,500 red corpuscles, is greatly in favour of kala-azar, and if the fever has persisted for less than one year, it is practically diagnostic of that disease.

"5. Marked loss of weight, especially if it continues under treatment in hospital, is much in favour of kala-azar as against chronic malaria.

"6. In cases of splenomegaly, a history of fever on and off for three years or more is almost diagnostic of chronic malaria as against kala-azar.

"7. The temperature curve affords the greatest diagnostic aid in chronic splenomegaly in Lower Bengal. If fever is absent, or ceases within seven days with or without quinine, active kala-azar can practically be excluded; while if fever persists beyond a week in spite of 20 to 30 grains of quinine a day, the case is so extremely likely to be kala-azar that the patient should be treated as such by tartar emetic intravenously, which is a specific remedy for the disease."

E. J. Wyler.

ABATE (A.). **Il kala-azar infantile a Catania. Note epidemiologiche e nosografiche.**—*Malaria e Malat. d. Paesi Caldi.* 1917. Apr. 20. Vol. 8. No. 2. pp. 57–68.

Notes on infantile kala azar, as observed in Catania. The number of cases recorded in this locality, since the first one by FELETTI in 1909, now amounts to 199. Figures are given, of only local interest, of the distribution of the cases. The homes of the patients, and the streets in which they are situated, leave much to be desired from a sanitary point of view. The greater number of cases begin in the early months of the year, as has been ascertained statistically, March and April contributing more than twice as many cases as August and September. The explanation of this fact has not been discovered. Leishmaniasis in dogs has only been exceptionally detected in Catania; out of 275 dogs examined by one observer only three were found to be affected with leishmaniasis, and in another series only 4 out of 165.

J. B. Nias.

BRODIE (Frederic) & YORKE (Warrington). A Case of Kala-Azar in the Mediterranean Expeditionary Force.—***Jl. Roy. Army Med. Corps.* 1917. Jan. Vol. 28. No. 1. pp. 91–97. With 1 chart.**

The importance of this case (which was diagnosed post-mortem by spleen puncture) lies in the fact that the infection may have been

acquired either in Egypt or Gallipoli. The patient had, however, been in India (Jubbulpore and Calcutta) from 1910 to January 1915. During that period he was in perfect health.

He left England on March 26th, 1915, for Egypt and remained there until April 22nd. He reached the Peninsula, where he was wounded. on April 29th. His final illness began on May 7th, and death occurred on November 10th.

If the patient was infected just prior to leaving India, the incubation period was at least four months. If the infection was contracted in Egypt or Gallipoli, the incubation period was less than a month.

[A paper referring to the infection of soldiers with kala azar in Malta was reviewed in this *Bulletin*, Vol. 8, p. 406. In the present case it is, however, not stated whether the patient landed at Malta.]

E. J. W.

COSTA (Pedro), Jr. **Nota preliminar sobre lesoes oculares da Leishmaniose.** [Preliminary Note on Ocular Lesions in Leishmaniasis.]—*Gaz. Med. Bahia.* 1916. June. Vol. 47. No. 12. pp. 496–498.

Notes on two cases of eye symptoms in muco-cutaneous leishmaniasis. In the first case, the patient, a man aged 23, presented total destruction of the nasal septum from leishmaniasis. In addition, there was a circular patch of new growth on the right eye, occupying the centre of the cornea and so obstructing vision. The tissue was opalescent and vascular. In addition there was slight pericorneal injection, with photophobia and lachrymation. The conjunctiva was strongly hyperaemic and sensitive, but without muco-purulent secretion. Treatment with fomentations and ointment of yellow oxide of mercury proved ineffective. The patient was subjected to a course of tartar emetic injections, followed by similar injections of Protosan, for the nasal condition, and was still under treatment at the time of writing. In the second case, the patient being a coloured man aged 38, there were multiple lesions of the face, mouth, nose, larynx and pharynx, due to leishmaniasis and in addition, a large ulcer which occupied the outer half of the right lower eyelid. In the vitreous humour of the corresponding eye there was present an opacity. Leishman bodies were detected in scrapings from the ulcer. On treatment with tartar emetic the eye lesion healed. Further details are promised in a forthcoming graduation thesis.

J. B. N.

SPAGNOLIO (Giuseppe). **La cura della Leishmaniosi interna con i preparati di antimonio.** [The Cure of Visceral Leishmaniasis with Preparations of Antimony.]—*Malaria e Malat. d. Paesi Caldi.* 1916. July-Aug. Vol. 7. No. 4. pp. 242-245.

Notes of four cases of visceral leishmaniasis in children, treated successfully with intravenous injections of tartar emetic. The cure required an average of 60 days, an injection being given every four or five days into the veins of the arm or the jugular, of from 5 to 10 cc. of a one per cent. solution of tartar emetic. For injection into the veins of the arm an ordinary syringe of 10 cc. capacity was used, but for the jugular the needle was connected with a Mohr's burette containing the solution, in order to regulate the flow. The treatment was tried on 10 other children, but for various reasons had to be abandoned.

J. B. N.

KHÀRINA-MARINUCCI (R.). **Influenza dell' antimonio sulla curva febbrile nella Leishmaniosi interna.** [The Action of Antimony on the Fever-Curve of Visceral Leishmaniasis.]—*Pediatria.* 1916. Dec. Vol. 24. No. 12. pp. 717–727. With 3 charts.

The author furnishes charts from two cases of infantile leishmaniasis, in one of which injections of tartar emetic were employed and in the other the acetyl-p-aminophenylstibiate of soda introduced by CARONIA. Both curves show the same features. The first doses of the antimony preparation do not influence the course of the fever, except perhaps in the direction of augmenting it, but as the cure proceeds and the temperature begins to fall to the normal, it can clearly be observed that each injection produces a temporary rise of temperature lasting for perhaps half a day or occasionally a little longer. The author explains this by supposing that each injection produces a chemical lysis of the parasites analogous to that produced naturally by anaphylotoxins resulting from the destruction of parasites in the tissues, as suggested by Di CRISTINA and CARONIA.

J. B. N.

MAGGIORE (S.) & SINDONI (M.). **Sulla presenza di leucotossine circolanti nel siero di sangue di infermi di leishmaniosi interna.** [On the Presence of Leucotoxins Circulating in the Blood-Serum of Patients with Visceral Leishmaniasis.]—*Pediatria.* 1917. Feb. Vol. 25. No. 2. pp. 81–88.

In view of the fact that in infantile leishmaniasis the blood shows more or less leucopenia, as the case advances, the authors set themselves to investigate the question whether there are not leucotoxins circulating in the blood which either destroy white corpuscles or impede their production. With this object in view they proceeded as follows :

Blood (about 2 cc.) is drawn from a vein in the arm of the patient and the corpuscles are washed two or three times with normal salt solution to remove the serum. Of the precipitated washed corpuscles one cc. is taken and diluted with an equal quantity of normal salt solution. After mixture by agitation, the liquid is divided into two parts. A small quantity of serum from a child afflicted with leishmaniasis is mixed in a tube with one-half, and an equal quantity of serum from a normal person with the other. A leucocyte count is made with a Thoma-Zeiss haemocytometer both before and after the addition of the serum, and the two tubes are then incubated at blood heat for periods of half-an-hour, one hour, and two hours in succession. At the end of each period in the incubator a fresh leucocyte count is made from each sample in order to see if there has been any destruction of leucocytes. The test is then repeated with serum inactivated by heating to 55° for half-an-hour, both normal and pathological. Working on these lines the authors find that there is a substantial reduction in the leucocyte count with patients' serum after an hour's incubation or more, in the ratio of 9 to 10, roughly, in one experiment, 8·5 to 10 in another, and 7 to 10 in two more. On the other hand with heated serum no such diminution occurs. The experiments were then repeated with water of condensation from a leishmania culture in the place of the patient's serum, when a similar result was obtained. The authors conclude from these experiments that there is a leucotoxin in the blood of leishmaniasis patients which is the cause of the leucopenia observed.

J. B. N.

LAVERAN (A.) & HAVET (J.). **Contribution à l'étude de la leishmaniose viscérale naturelle du chien.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 386–392. With 1 plate.

A young female dog was inoculated intravenously on 7th October, 1916 with bone marrow from a dog infected with canine leishmaniasis sent from Tunis by Dr. NICOLLE to one of the authors. This animal had been inoculated from another which had acquired the disease naturally in Tunis. Death occurred on 1st February, 1917, 117 days after inoculation, the determining cause being intraperitoneal haemorrhage due to tearing of the spleen capsule, apparently spontaneous. The post-mortem appearances are minutely described and cannot be summarized. The authors emphasize their observation that the hepatic cells are the site of election of the parasites in the liver and that they are found in far smaller numbers in the connective tissue cells, the plasma cells, or the endothelial cells of the capillaries. They point out that their observations do not, therefore, agree with those of CHRISTOPHERS and of STATHAM as to the site of election of leishmania in human kala azar in the endothelial cells of the liver capillaries.

E. J. W.

NICOLLE (Ch.) & BLANC (G.). **Extension de la "région à bouton d'Orient" tunisienne.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 378-379.

The occurrence of a case of oriental sore acquired on the Algerian frontier of Tunis enables the authors to point out that the geographical distribution of this disease here overlaps that of kala azar.

E. J. W.

BOUILLIEZ (Marc). **Auto-observation d'un cas d'inoculation accidentelle de Bouton d'Orient sur la conjonctive.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 1–2.

In manipulating a syringe containing material from a mouse infected with *L. tropica* a droplet of the fluid was accidentally introduced into the author's eye. No ill-effect was experienced for about four months when a swelling was noticed on the conjunctival surface of the lower lid, which gradually attained the size of an almond and proved to contain numerous leishmania. The skin over the lesion was red but not adherent. The conjunctival surface was covered with soft, easily bleeding granulations. Treatment by lavage with arsenobenzol was found to be ineffectual.

E. J. W.

i. BOUILLIEZ (Marc). **Recherches expérimentales sur *Leishmania tropica*.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 66–86. With 1 text fig.

ii. LAVERAN (A.). **Au sujet de l'évolution des infection expérimentales des petits Rongeurs par** *Leishmania tropica.*—*Ibid.* Feb. No. 2. pp. 110–113.

i. Oriental sore is endemic in the Fort Archambault district (French Congo). Numerous experiments were made with a view to ascertaining the effect upon various animals of inoculation with *L. tropica.* The virus, obtained from a human or animal source, was inoculated direct, without intermediate culture.

African monkeys (Cercopithecus) developed a lesion at the site of inoculation, indistinguishable from oriental sore, after an incubation period varying from 20 to 75 days. Intraperitoneal injection had a negative result. Dogs reacted in the same way as monkeys. Two monkeys were reinoculated (skin) with leishmania obtained from their own lesions, before these were healed. The result was negative. One of them was then re-inoculated with its own virus 18 days after healing had taken place. Twenty-five days later a small nodule had formed in which numerous parasites were found.

Rats and mice developed a general infection as the result of intraperitoneal inoculation, the parasites being found in the liver, spleen, kidneys, suprarenals, lungs, etc. After a variable time local lesions usually made their appearance (in the testicle, snout, posterior tarsometatarsal joints, etc.) during the evolution of which the parasites disappeared from the viscera. These results were obtained in 35 out of 40 cases. Skin inoculations of other animals (4 kids, 1 sheep, 1 antelope, 2 cats, 4 fowls, 1 genet) were negative.

Intraperitoneal inoculation of squirrels was negative, as also were skin + intraperitoneal inoculation of cats.

ii. The author criticises the statement that certain rodents, after intraperitoneal inoculation of *L. tropica* develop, first, a general infection, and later, local lesions. He points out that in numerous experiments made by him on mice he has observed exactly the opposite. The following two experiments are described, which, in the author's opinion, are conclusive. Two white adult mice were intraperitoneally inoculated on the 17th and 25th March and on the 11th April, 1916 with cultures of *L. tropica.* In both, on the 19th April an induration had appeared in the testicular region which was found to contain leishmania. One of the mice was killed on the 27th April, numerous parasites being found in the testicles and surrounding tissues but none in the liver, spleen, or bone marrow. The remaining animal was killed on the 27th May. Numerous leishmania were present in the testicular tumours and the parasites were also found in the liver and (though scanty) in the spleen. None were found in the bone marrow.

It is pointed out that in making an autopsy on a small rodent having numerous leishmania in the peritoneum, smears of the liver and spleen may readily become contaminated and that, in this way, erroneous conclusions may be arrived at.

The author ends by remarking that the strain used by him may possibly have been less active than that used by M. BOUILLIEZ and that the latter experimented upon the rodents of Fort Archambault whereas the author used white mice.

E. J. W.

LAVERAN (A.). **Boutons d'Orient expérimentaux chez un** *Cercopithecus mona* **et chez un** *Cercocebus fuliginosus*.—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 291–293.

An account of the successful inoculation of two monkeys—*Cercopithecus mona* and *Cercocebus fuliginosus*—from a mouse infected with *L. tropica*. The technique employed was that described in this *Bulletin*, Vol. 8, p. 10.

E. J. W.

ITURBE (Juan). **Primer caso de leishmaniosis cutánea en Venezuela.** [The First Reported Case of Cutaneous Leishmaniasis in Venezuela.]—*Gaceta Med. de Caracas.* 1917. Feb. 15. Vol. 24. No. 3. pp. 20–21. With 1 text fig.

An account of a case of cutaneous leishmaniasis, being the first reported from Venezuela. The patient was examined and the diagnosis confirmed by Messrs. GORGAS, GUITERAS and CARTER of the Rockefeller Institute Yellow Fever Commission. The lesions consisted of ulcers on both legs, and nodules on the right forearm and knee. The patient was treated with tartar emetic, with the result of a cure at the end of one month.

J. B. N.

LINDENBERG (Adolpho). **Tratamento da ulcera de Baurú pelo tryposafrol.** [The Treatment of Cutaneous Leishmaniasis by Tryposafrol.]—*Ann. Paulist. Med. e Cirurg.* 1915. Aug.-Oct. Vol. 5. Nos. 2, 3, 4. pp. 145–147. With 1 plate.

Brief notes of the treatment of three cases of cutaneous leishmaniasis with a substance known as tryposafrol, a derivative of safranin, obtained by BRIEGER and KRAUSE, of Berlin. Two samples in succession were furnished to the author by Professor BRIEGER, the first consisting of the original tryposafrol which did not give altogether satisfactory results, and the second of a modification called novo-tryposafrol which was much more satisfactory in use. Novo-tryposafrol is given internally in tablets or capsules in a dose of 25 to 50 centigrammes, with a maximum dosage of 2 grammes daily, if the stomach will bear it. *Case I* was in a Japanese boy aged 14, with an ulcer on the heel 3·5 centimetres in diameter. A cure was obtained in a month with 30 grammes of the remedy. *Case II*, a Syrian boy, aged 18, had two ulcers on the leg, one 4, and the other 3½ centimetres in diameter. A cure was obtained in two months with 34 grammes. *Case III*, an Italian boy, aged 18, had also two ulcers on the leg, the largest more than 5 centimetres in diameter. A cure was obtained in two months with 72 grammes.*

J. B. N.

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* Tryposafrol and novo-tryposafrol have been used in trypanosomiasis and canine piroplasmosis with little success [see this *Bulletin*, Vol. 6, p. 379].

DA MATTA (Alfr.). **Eméticothérapie dans la leishmaniose tégumentaire.** —*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 34–37. With 1 plate.

Solutions of tartar emetic do not keep well and should be freshly prepared. The probability of the occurrence of headache, vomiting, neuralgia, muscle and joint pains, etc., in the course of the treatment by intravenous injection is lessened by giving the injections in series of four or five on successive or alternate days with intervals of a few days between each series.

E. J. W.

ESCOMEL (E.). **Le traitement de la Leishmaniose Américaine par l'oxyde d'antimoine.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 381–384. With 1 plate.

The author has successfully treated several cases of American leishmaniasis with oxide of antimony solution (Martindale). It keeps well and can be given subcutaneously, intramuscularly, or intravenously. It produces no local or general reaction. Injections may be given weekly of 6–8cc. of Martindale's solution, or every two days in doses of 1–2cc. The best results were obtained by the latter method. All cases were treated as out-patients.

E. J. W.

ESCOMEL (Edmundo). **Leishmaniasis y Blastomicosis en el Peru y Bolivia.** [Leishmaniasis and Blastomycosis in Peru and Bolivia.] —*Cronica Med.* Lima. 1915. Mar. Vol. 32. No. 621. pp. 54–56.

A note of some importance to the compilers of text-books on tropical diseases. The author points out that the Peruvian name "Uta" rightly belongs to muco-cutaneous Leishmaniasis, while "Espundia" should be reserved for Blastomycosis of the pharyngeal region. The former is protozoal in type and yields to such remedies as "606," while the latter is due to a parasite of vegetable nature, and has been found hitherto rebellious to all medicinal treatment.

J. B. N.

GABBI (Umberto). **Sulla unicità etiologica delle varie Leishmaniosi.** [The Etiological Unity of the Various Forms of Leishmaniasis.] —*Malaria e Malat. d. Paesi Caldi.* 1917. Jan.-Feb. Vol. 8. N. 1. pp. 10–20.

A critical review of recent opinions as to the essential unity of the various forms of leishmaniasis. Without knowledge of the monographs referred to, it is not possible to follow the author's arguments. Specialists should consult the original paper. No bibliography is appended.

J. B. N.

TYPHUS.

PIERCE (C. C.). **Combating Typhus Fever on the Mexican Border.**—*Public Health Rep.* 1917. Mar. 23. Vol. 32. No. 12. pp. 426–429. With 4 figs.

Although typhus fever has been endemic for many years in the plateau regions of Mexico, it was not until a year ago that attention was attracted to the menace which the flight of refugees from the disturbed areas had created. In this paper the methods brought into play to prevent its spread into the United States are described, and the thoroughness with which the measures have been carried out is reflected in the fortnightly return incorporated in the report.

The disinfection of the clothes of those examined is carried out by means of "live steam," and is described as follows:—

> "When the clothes in bundles are passed into the disinfecting room they are at once placed in the carriage of the steam chamber, and as soon as this is filled the chamber is closed. A vacuum of 10 to 15 inches is created in the chamber and live steam is then introduced until the pressure gauge shows 20 pounds, which gives a temperature of 259° F. This is maintained for 10 minutes to insure penetration of all bundles, after which time the chamber is opened. . . .
>
> "The creation of a second vacuum of 10 inches . . . will dry the clothes completely." . . .
>
> "Lice and their eggs are killed by a very short exposure to 212° F., but the higher temperature is easily obtained and held to insure efficiency."

The time for sterilization of the clothing is from 25–35 minutes, depending on the amount of clothing in the chamber.

Vaccination is insisted upon in the case of all those whose person is freed from lice and whose clothing is disinfected.

R. P. Cockin.

ARNOULD. **Notes sur quelques cas de typhus exanthématique; difficulté du premier diagnostic dans une épidémie.**—*Jl. de Méd. de Bordeaux.* 1916. July. Vol. 46. Year 87. No. 9. pp. 167–170. With 1 chart.

Notes on eleven cases of typhus fever, occurring amongst the hospital attendants on board a French hospital ship. These men became heavily infested with lice, whilst attending upon a convoy of sick soldiers who were suffering from various diseases, amongst which typhus fever was not [knowingly] included. The sick soldiers came from a district [the locality is not stated] where typhus fever had not been diagnosed and were disembarked into hospitals which for some time previously had received cases from the same district, and from which institutions no case of typhus fever had been notified. The first case observed, amongst the hospital orderlies, died within eight days of reporting sick, and it was only at the post-mortem examination that typhoid fever was definitely excluded and typhus suspected. (All the patients had previously received preventive inoculation against typhoid fever.) The remaining ten cases were all observed during the following twelve days, were despatched to hospital, and, as far as the writer knows, recovered.

Arnould states that the cases were characterised by an atypical rash, in which there was a complete absence of petechiae. The tendency of the exanthem was to simulate that observed in typhoid fever—more or less discrete "rose spots" being a marked feature. He says also that hydrotherapy had no effect in reducing the temperature.

It is in such cases as these, at the beginning of an epidemic, that diagnosis must, and can only, be made by a process of elimination.

R. P. C.

Yakimoff (W. L.). **Un cas intéressant de typhus exanthématique.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 94–95.

This paper gives the notes on a fatal case of typhus fever, occurring in a Russian soldier at Sarakamych. The case was complicated by a streptococcal septicaemia and is interesting as showing the effect of this organism as a complicating factor in the course of this disease. When first seen, the case was diagnosed as typical typhus exanthematicus. The rash was petechial, widespread and discrete. The next day, the petechiae had attained considerable dimensions and measured 5 cm. in diameter. On the left side and back they had become confluent, and the skin appeared bluish-violet in colour in consequence of the subjacent haemorrhages. The urine was bloody, and considerable admixture of blood was present in the faeces.

The following day, the haemorrhages had become confluent over, practically, the whole surface of the body; the chest, sides, back, base of neck and parts of the limbs and head being entirely covered by them. The buccal mucosa and sclerotics also displayed the presence of haemorrhages.

The following day, the patient died. At the autopsy, haemorrhages were found on all the serous surfaces, the surface of the heart, the mesentery, the vesical and intestinal mucosa, the suspensory ligament of the liver, the supra-renal bodies, &c. The blood was not coagulated and no clots were present when the autopsy was performed, on the day following the patient's death.

A streptococcus, probably *S. rotundus*, was isolated from the blood, and the haemorrhages which characterised the disease in this case are attributed by the author to the hacmolysing properties of this organism.

R. P. C.

Lipschuetz (B.). **Die klinischen Merkmale des Fleckfieberexanthems.** [Clinical Features of the Typhus Rash.]—*Dermatol. Woch.* 1916. July 8 & 15. Vol. 62. No. 27, 28. pp. 627–639, 666–679.

These papers give an exhaustive account of the various rashes which may be observed in typhus fever cases. The author considers that no specific exanthem for the disease is yet known, and that the rash is only of diagnostic value when irregular, fixed, isolated spots (which show no further change into papules, pustules or blisters) occur with other manifestations of the disease.

The author expresses some doubt as to the authenticity of all those cases of typhus *sine exantheme* which have been recorded. He, himself, has seen one such, which he regards with the gravest doubt.

With reference to the differential diagnosis of the exanthem of this disease from that of cerebro-spinal fever, the author quotes Arnold as stating that, in the latter disease, the development of "centrally situated blisters" prevents confusion with the rash of typhus fever.

Lipschütz tabulates the various rashes which may be found in typhus fever as follows:—

1. Prodromal rashes
   - (a) Macular form (rare).
   - (b) Papular form.
2. Exanthem
   - (a) Pseudo-morbilliform.
   - (b) Macular or Maculo-haemorrhagic form. (The maculae may be small, medium-sized or large.)
   - (c) Reticular exanthem of the upper arm, the lower part of the thigh, etc.
   - (d) Keratosis follicularis haemorrhagica.
   - (e) Late forms
     - *i.* Pseudomorbilliform or Scarlatiniform erythema of the forearms.
     - *ii.* Inflammatory exanthem on the inner sides of the feet. (9th or 10th day.)
3. Skin changes -post exanthem
   - (a) Pigmentation.
   - (b) Desquamation.
   - (c) Gangrene.

The author notes that, along with the exanthem, the conjunctiva may show marked injection, conjunctivitis or circumscribed haemorrhages into both palpebral and ocular conjunctiva.

In the mouth, haemorrhages may be observed on both the hard and soft palate and diffuse angina may supervene.

R. P. C.

Rostoski. **Das Stauungsphänomen bei Fleckfieber.** [The Stasis Phenomenon in Typhus.]—*Münch. Med. Woch.* 1917. Mar. 13. Vol. 64. No. 11. pp. 371–372.

The use of artificial blood-stasis, as a means of diagnosis, in early or doubtful cases of typhus fever, is discussed at some length in this paper. [Artificial blood-stasis is brought about by the application of a tourniquet to one or other of the limbs, with the object of calling forth the rash in the area distal to the point of constriction—see this *Bulletin*, Vol. 9, pp. 347.]

Two methods are discussed—one, that of Pioro, involves the application of a tourniquet round the upper arm for from 5–30 minutes; the other, that of Dietsch, necessitates its application for ½–1 minute.

Rostoski is of opinion that Dietsch's method has the advantage of being more expeditious and equally as efficacious in producing the rash. This method has been proved trustworthy in all the cases on which it has been used for the past two years.

PIORO's method not only brings out the rash, but causes a certain amount of haemorrhage in the congested area—especially in the region of the elbow joint. This method has nothing to commend it.

R. P. C.

COLDEN. **Zentrale Netzhautblutung bei Fleckfieber.** [Central Retinal Haemorrhage in Typhus.]—*Deut. Med. Woch.* 1917. Mar. 1. Vol. 43. No. 9. p. 267.

The author records here the case of a typhus fever convalescent who came under his notice complaining of defective vision in one eye. The patient had observed the defect whilst still under treatment and since it did not clear up along with the other symptoms of the disease he came to the author for treatment.

The examination of the eye showed a haemorrhage of the retina, involving the macula lutea and bulging out into the vitreous. The fovea centralis was not encroached on and to this escape the author ascribes the comparatively good sight which the patient enjoyed. The edges of the retina as also the choroid were unaffected by the haemorrhage. Treatment was directed solely to the encouragement of reabsorption and the condition cleared up in the course of seven weeks.

WESSELY is quoted as describing subconjunctival bleeding in this disease, and GUTMANN, fine petechiae in the region of the A. centralis retinae.

R. P. C.

i. BAEHR (George) & PLOTZ (Harry). **Blood-Culture Studies on Typhus Exanthematicus in Serbia, Bulgaria, and Russia.**—*Jl. Infect. Dis.* 1917. Feb. Vol. 20. No. 2. pp. 201–218.

ii. POPOFF (Methodi). **Ueber den** ***Bacillus typhi exanthematici*** **Plotz.** —*Deut. Med. Woch.* 1916. Apr. 20. Vol. 42. No. 16. pp. 471–476.

i. Baehr and Plotz give the results which they have obtained from an extensive series of blood-cultures, made from typhus fever patients, in the Balkans and Russia.

Altogether 64 patients suffering from this infection were under their notice and the writers state that they were able to confirm their previous observation, made in New York, " that *B. typhi exanthematici* is present in the blood during the febrile period of the disease." Out of 40 cases in Serbia and Bulgaria from which anaerobic cultures were made, *B. typhi exanthematici* was isolated in 19 of the series (47·5 per cent.). The Volhynian (Russia) cases gave positive cultures in 19 out of 24 which were studied bacteriologically (79 per cent.).

The writers state that " the organism is present in the blood in typhus fever from the first day of the disease and can be recovered from the blood during the whole febrile course of the illness."

They also add that the intensity of the blood infection " runs parallel with the severity of the disease." Enormous numbers of organisms were found to be present in two of the Russian cases in which blood-cultures were made during a chill—" in one case at the very outset of the illness."

The medium used for the cultures was that recommended by LIBMAN as "the optimal medium for bacterial cultivation"—ascitic fluid, glucose agar. The authors point out that *B. typhi exanthematici* has now been isolated, in pure culture, from the blood of typhus fever patients in the United States, Mexico, Serbia, Bulgaria, Austria and Russia and that their present observations confirm and strengthen the evidence that this organism is the etiological agent in the disease. Full and complete descriptions of the preparation of media and other necessary technique is given.

ii. Popoff, working in the Balkans, announces that he has succeeded in cultivating *B. typhi exanthematici* from the blood of six out of ten typhus fever cases. The organism was in pure culture and PLOTZ'S observations as to morphology and cultural characteristics are amply confirmed.

Popoff includes in his article several tables showing the agglutination reactions of the organism.

R. P. C.

PRZYGODE (P.). **Bakterielle Befunde im Blute von Fleckfieberkranken.** [A Bacillus isolated from Typhus Cases.]—*Deut. Med. Woch.* 1917. Feb. 22. Vol. 43. No. 8. pp. 234–236.

In the course of a typhus fever epidemic, the writer isolated from the blood of a number of clinically undoubted typhus fever patients an organism which, in appearance, was identical with the cocco-bacillus described by PLOTZ. The organism is described as being a short bacillus, Gram positive, non-motile and strictly anaerobic.

This microorganism was agglutinated with the serum taken from typhus fever patients. Control agglutination tests carried out with normal serum and the serum from typhoid, dysentery and paratyphoid B cases were negative.

These specific immunity reactions, in the opinion of the writer, establish the relationship between the typhus fever epidemics in New York. Serbia, Wolhynia and in the place in which the above work was carried out.

R. P. C.

i. WEIL (E.) & FELIX (A.). **Untersuchungen über das Wesen der Fleckfieber-Agglutination.**—*Wien. Klin. Woch.* 1917. Mar. 29. Vol. 30. No. 13. pp. 393–399.
ii. EPSTEIN (Emil) & MORAWETZ (Gustav). **Zur Serodiagnostik des Fleckfiebers.**—*Ibid.* pp. 399–408.
iii. ARNSTEIN (Alfred). **Zur Bewertung der Weil-Felix'schen Fleckfieber-Reaktion.**—*Ibid.* pp. 409–410.
iv. WELTMANN (Oskar). **Weiterer Beitrag zur serologischen Fleckfieberdiagnose.**—*Ibid.* pp. 408–409.

i. Discussing the nature of the Weil-Felix reaction* in the first paper, Weil and Felix state that both the agglutinins and the bacteria are specific.

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* [The so-called "Weil-Felix" reaction is dependent upon the fact that in the blood-serum of typhus fever cases an agglutinin occurs which will produce clumping in cultures of an organism of the *Proteus vulgaris* group. This organism can be isolated from both the urine and faeces of typhus fever cases. According to WILSON (see below) the reaction is a heterologous agglutination.]

The presence of these specific agglutinins is dependent on the production of a specific antibody in typhus fever blood, and consequently the reaction always failed in other diseases—typhoid, enteritis and dysentery.

ii. Epstein and Morawetz consider the Weil-Felix reaction of great diagnostic value in typhus fever. They state that the reaction may be obtained throughout the whole clinical course of the disease and for many weeks subsequently. A positive reaction obtained in the course of another febrile illness indicates either typhus fever as a complication or as a previous infection. The Weil-Felix reaction was found by these workers to be negative in all cases in which typhus fever could be clincally excluded.

Referring to the Weltmann " Trübung" reaction they state that they found it unsatisfactory. In the early stages of typhus fever it was useless, in non-infected cases they obtained positive results in 6 per cent. of their cases and in marked cases of typhus fever 16 per cent. of their results were negative.

iii. Arnstein is in general agreement as to the diagnostic value of the Weil-Felix reaction in this disease and his conclusions tend to support those arrived at by Epstein and Morawetz.

iv. Weltmann admits that the " Trübung " reaction has only real value in those cases of typhus fever which run an atypical course. The value of the reaction is limited by the short period during which it can be obtained —from the end of the second week until two weeks after the end of the fever, when it disappears but the constancy of its presence during the course of all typhus fever cases gives it an undoubted value.

R. P. C.

WILSON (W. James). **Typhus Fever and the So-Called Weil-Felix Reaction.** [Correspondence.]—*Brit. Med. Jl.* 1917. June 16. pp. 825–826.

In this communication Wilson complains that the so-called " Weil-Felix " reaction, which is being largely used in Germany " for the systematic testing of blood taken from typhus fever patients," was worked out by him at Belfast some ten years ago and published in Vols. 9 and 10 of the *Jl. of Hygiene.*

In his paper, " Etiology of typhus fever " [which appeared in *Jl. of Hygiene,* 1910, Vol. 10, pp. 155–174], the following appear as two of his main conclusions :—

> " (4) From the faeces of one case [of typhus fever] a variant form of *B. coli communis* was cultivated, on which the blood serum of 17 Typhus Fever cases was found to have 3 to 10 times the agglutinative effect of normal serum.
>
> " (5) From the urine of two cases, a bacillus resembling *B. coli communis* but having no action on lactose was cultivated. This bacillus was agglutinated in dilutions of 1 : 50 and 1 : 100 by the serum of the cases but not by normal serum."

This latter organism is termed by WEIL and FELIX " X. 19 " and DIETRICH has showed that it belongs to the *Proteus vulgaris* group.

In 500 cases of typhus fever from the German Army, 90 per cent. agglutinated this bacillus in a 1 : 100, or higher, dilution of the patients' serum. In non-typhus cases this agglutinative property was absent or " only present to a feeble extent."

In a previous paper [*Jl. of Hygiene*, 1909, Vol. 9, pp. 316–336] Wilson deals with the whole question of the heterologous agglutinins, more especially those found to be present in the blood-serum of cerebro-spinal and typhus fever cases.

He states that "the heterologous agglutinins are bound up with the globulin component of the serum"; and that by heating the serum for 10 minutes at 60° C. the power to agglutinate meningococci is lost. Another part of the agglutinins remains, which is lost when the serum is further heated for 10 minutes at 65° C. This is due, according to the writer, to the union of part of the agglutinins with the "pseudo-globulins"; whilst the remainder is in alliance with the euglobulin fractions. It is interesting to note, in this connection, that the blood-serum of 18 out of 31 cases of typhus fever agglutinated *B. typhosus* in 1 : 50 dilutions.

The writer considers that "those who hold that it is possible by the agglutination test to diagnose the infective agent, even in the case of inoculated subjects," would be well-advised to pay more attention to the question of heterologous or para-agglutination

R. P. C.

REICHENSTEIN (J.). **Ueber Komplementbindung bei Fleckfieber mit X_{19}.**—*Deut. Med. Woch.* 1917. May 3. Vol. 43. No. 18. p. 554.

This is a confirmation of the results of KOLLE and SCHLOSSBERGER'S work on the complement fixation in typhus fever with X_{19}.*

Although he did not obtain such a high percentage of positive results as these workers, yet he is of opinion that the test is of undoubted value in the diagnosis of the disease.

He adds that the Wassermann reaction is negative in all positive cases of typhus fever and that therefore no doubt exists as to the specificity of the reaction for this disease.

R. P. C.

OLITSKY (Peter K.). **The Nonfiltrability of Typhus-Fever Virus.**—*Jl. Infect. Dis.* 1917. Apr. Vol. 20. No. 4. pp. 349–356. With 2 charts.

Dr. LIBMAN'S observations led him to the conclusion that a very large percentage of monkeys were immune to typhus fever infection, and that results drawn from experiments on these animals must be viewed with the gravest suspicion, whilst immunity to the infection in mature guinea-pigs is almost unknown.

Olitsky, benefiting by LIBMAN'S experiments, states that he has used guinea-pigs throughout his research and considers that the use of monkeys by other workers—whose work he reviews—goes far to vitiate the results they obtained.

The virus used in the following experiments was one which had originally been obtained from a case of endemic typhus fever and had been transmitted from guinea-pig to guinea-pig during a period of five years. Its incubation was practically constant—about 10 days—and the duration of the fever was from four to six or seven days.

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* *Medizinische Klinik*, 1917. No. 10.

The blood was prepared by exsanguinating an infected guinea-pig at the height of the typhus fever reaction, defibrinating the whole of the blood and then centrifuging. After suitable dilution, with normal, physiological salt solution, the diluted blood was filtered through a Berkefeld type of filter, size N., at a pressure of 500 mm. of mercury.

In each series of experiments the same blood was used throughout-- " the unfiltered blood was obtained from the material left on the outer side of the candle ; the filtered blood, from what passed through."

Experiment 1.—The first guinea-pig was inoculated, intraperitoneally, with an amount of unfiltered, diluted serum equivalent to 2 cc. of the whole serum. Eleven days later the animal developed a fever of over 40° C. which lasted for four days, and terminated by crisis. After 11 days of normal temperature this animal was reinoculated with 4 cc. of defibrinated blood taken from a guinea-pig [No. 572] at the height of the typhus fever reaction. No reaction followed, although a smaller quantity [3 cc.] of the same defibrinated blood injected into a control guinea-pig gave a rise in temperature after an incubation period of 10 days.

Experiment 2.– The second guinea-pig was inoculated with the filtrate of the same serum used for the first animal. An amount equivalent to 4 cc. of the whole serum was injected intraperitoneally. No reaction followed in the course of the ensuing 28 days. At the end of this period the animal was inoculated with 2 cc. of the same defibrinated blood [No. 572] as that used for the first animal. After an incubation period of 9 days the animal developed typhus fever which lasted for six days.

R. P. C.

DENZER (Bernard S.) & OLITSKY (Peter K.). **Studies on Immunity in Typhus Exanthematicus with Reference to the Antibodies in Man and Guinea-Pig demonstrable by the Dale Method.**—*Jl. Infect. Dis.* 1917. Jan. Vol. 20. No. 1. pp. 99–108. With 9 figs.

A highly technical paper which gives the results of the work of these authors on the anaphylactic response obtained from the sera of human cases and guinea-pigs which were suffering, or recovering, from typhus exanthematicus infection.

The method used was that devised by DALE, which depends upon the muscular contraction of the uterus of a sensitized guinea-pig when brought into contact with the antigen. The main conclusions at which they arrived may be briefly summarised as follows :—

1. The antibodies to *B. typhi exanthematici* are found in the serum of typhus fever cases after the crisis. They are not present during the height of the disease. The same results were obtained with guinea-pig serum.

2. The reaction of the serum of typhus fever cases is specific.

R. P. C.

CSERNEL (Eugen). **Ueber eine anaphylaktische Reaktion bei Fleckfieber.**—*Wien. Klin. Woch.* 1917. Feb. 22. Vol. 30. No. 8. pp. 229–232.

Csernel, as the result of his experimental work on the anaphylactic reaction in typhus fever, states the following as his main conclusions :

1. Anaphylaxis was produced in previously immunised guinea-pigs by the intracardial injection of typhus fever blood.
2. The reaction was brought about by the injection of blood from "one day" convalescents, as well as from patients who were in the exanthem stage of the disease.
3. Guinea-pigs immunised against another organism than the virus of typhus fever did not develop anaphylaxis when injected intracardially with typhus fever blood.

He states that animals immunised against Friedlander's bacillus and various strains of streptococci exhibited no reaction when inoculated later with blood from haemorrhagic cases of typhus fever and vice versa.

R. P. C.

ERRATUM.

Vol. 9, No. 7, p. 351, second sentence of paragraph 2 should run :—"Not all, nor even the majority, of the lice from a prison camp where there is typhus are considered to be infected, and it is thought improbable that all lice from typhus patients are capable of causing the disease."

CHOLERA.

BULLETIN DE L'OFFICE INTERNATIONAL D'HYGIÈNE PUBLIQUE. — 1917. Apr. Vol. 9. No. 4. pp. 433–439.—**Note de l'administration sanitaire italienne sur les revaccinations antityphiques et anticholériques.** (Communiquée par M. le Professeur SANTOLIQUIDO, Délégué de l'Italie dans le Comité de l'Office International d'Hygiène publique.)

The opinion is expressed that a yearly cholera inoculation may be considered sufficient for the permanent establishment of immunity unless specially dangerous circumstances suggest a more frequent vaccination; that a single injection (the last done of the usual series) is sufficient for reinoculation; and that the spring is the most advantageous time for cholera inoculation, seeing that summer and autumn are the dangerous seasons.

H. Schütze.

PAPAMARKU (P.). **Beiträge zur Frage der Choleraimmunität bei Schutzgeimpften.** [Immunity after Cholera Inoculation.]—*Münch. Med. Woch.* 1917. Mar. 27. Vol. 64. No. 13. pp. 425–428.

The examination of the sera of 60 soldiers inoculated against cholera demonstrated the fact that in the great majority of cases bacteriolysins begin to disappear after 6-7 months. There is, however, no parallel to be drawn between amount of bacteriolysin and degree of immunity, for immunised animals deprived of their bacteriolysins by a renewed cholera inoculation or whose immunisation is of such recent date (three or four days) that no antibodies have had time to form, may possess in spite of this absence of bacteriolysins considerable immunity.

The writer considers a yearly inoculation (one loop of culture followed by two loops) to be sufficient to maintain a fair immunity.

H. S

JOETTEN (K. W.). **Über die Prüfung der zur Schutzimpfung gegen Cholera und Typhus hergestellten Impfstoffe.** [The Testing of Cholera Vaccines.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1917. Jan. 31. Vol. 83. No. 2. pp. 276–302.

Some 46 samples of cholera vaccine prepared at various laboratories and of various ages were compared with regard to their homogeneity, numerical strength, opacity and the morphological condition of the vibrios. Some samples were found to remain unaltered in practically all respects for periods as long as two years; with others a change in opacity, numerical strength and morphology of the vibrio was observed, but rarely before six months [no indication is afforded of the reason of this varying behaviour of different samples].

In agreement with other observers it is stated that there is no exact parallel between the opacity and the numerical strength of a vaccine.

Employing between 9 and 12 samples of vaccine of varying age and the sera of rabbits inoculated with them (one rabbit to each vaccine) the author found *no notable difference in the agglutinin, bacteriolysin and complement fixing body content of these sera.*

A standardisation of vaccine by means of the complement fixation test is suggested as being a possibly more reliable method than counting or standardising by opacity (the vaccine to be used as antigen and a cholera serum as amboceptor).

Complement deviation tests with several of the cholera vaccines, already seen to be of equal antigenic power, gave similar results, thus pointing to the possibility of the method being of practical use.

H. S.

LUSTIG (Alessandro). **Sui metodi per saggiare l'attività dei vaccini (antitifici, anticolerici).** [The Testing of Vaccines.]—*Giorn. di Med. Milit.* 1916. Dec. 31. Vol. 64. No. 12. pp. 881–887.

A plea for the testing of vaccines for their antigenic properties and durability, the author suggesting that precipitation, agglutination and complement fixation tests should be carried out with the vaccine as antigen, that animal inoculations should be performed, the sera being then tested for antibodies and the animals themselves for immunity. With regard to the durability of vaccines, CASTELLANI is quoted as giving four months as the limit, FULLE as having shown that cholera vaccine one month old produced an agglutination titre of $\frac{1}{500}$, when four months old only $\frac{1}{100}$ and when eight months old no rise in titre at all [only two rabbits used in each case apparently].

H. S.

IZAR (GUIDO). **Sui diversi vaccini anticolerici in uso nell' esercito.** [On Various Cholera Vaccines.]—*Sperimentale.* 1917. May 28. Vol. 71. No. 1–2. pp. 96–102.

With four different cholera vaccines were inoculated in each case 100 soldiers and after one month the sera of the men examined for agglutinins, bacteriolysins and complement fixing bodies; the local and general reactions were also observed. In each case the number of vibrios inoculated was the same; the inoculation was subcutaneous.

One vaccine (Firenze) stood out to some extent as causing less marked reaction in the men and as possessing better antigenic properties. No information is given, however, as to what differences in preparation there were in the four vaccines.

H. S.

FOX (C. J.). **A Note on the Effect of Inoculating Rabbits with Cholera Vaccine prepared in Various Ways.**—*Indian Jl. Med. Res.* 1916. Oct. Vol. 4. No. 2. pp. 335–339.

The table at the end of the paper effectively summarises the results: the rabbits were inoculated subcutaneously, agglutination being used as indicator of the antigenic value of the vaccine and the temperature as a guide to the general reaction occasioned (local reaction in the rabbit produced only by Haffkine's vaccine and the sensitised vaccine plus serum). The numbers in the table refer to rabbits, five being used with each vaccine. First Series had one inoculation. Second Series had four inoculations with intervals of four days. Third Series had four inoculations, four, six, and ten days being the intervals. Agglutination tests [and apparently the taking of the temperature] were carried out three days after inoculation.

TABLE I.

Tabular Statement showing the effect of various Cholera Vaccines on the agglutinating power and temperature of rabbits.

	Agglutinating power of serum.							Rectal Temperature.					
	1–2048	1–1024	1–512	1–256	1–128	1–54	1–32	105° F.	104° F.	103° F.	102° F.	101	100
1st Series.—													
Carbolized vaccine	..	..	..	1	2	1	1	..	..	..	1	4	..
Living (Haffkine's) vaccine	..	..	..	4	..	..	1	..	..	2	3	..	..
Strong's vaccine	..	..	..	..	4	1	..	..	..	..	3	2	..
Sensitized vaccine (serum removed)	..	..	..	1	..	3	1	..	..	1	2	2	..
2nd Series.—													
Carbolised vaccine	..	1	3	1	..	..	..	..	..	..	1	1	3
Living (Haffkine's) vaccine	..	1	3	1	..	..	..	..	..	1	1	2	1
Strong's vaccine	..	..	2	1	1	..	1	..	..	..	..	3	2
Sensitized vaccine	..	..	..	..	..	2	3	..	..	..	2	3	..
3rd Series.—													
Carbolized vaccine	1	3	1	..	..	..	..	..	2	3	..	..	..
Living culture	4	1	..	..	..	..	..	1	2	1	1	..	..
Modification of Strong's vaccine	4	..	1	..	..	..	..	..	3	1	1	..	..
Sensitized vaccine	1	2	2	..	..	..	..	1	1	..	3	..	..
Sensitized vaccine + serum	2	2	..	..	1	..	..	2	2	1	..	..	..
Heated vaccine	5	..	..	..	..	..	..	1	3	1	..	..	..
Heated vaccine + serum apart	3	1	..	..	..	..	1	..	5	..	..	..	..
Heated vaccine + serum removed	1	2	2	..	..	..	..	..	1	3	1	..	..

H. S.

Bail (Oskar). i. **Choleragift und antitoxische Zellwirkungen.** [Cholera Toxin and the Antitoxic Effect of Cells.]—*Zeitschr. f. Immunitätsforsch.* 1. Teil. Orig. 1916. Oct. 12. Vol. 25. No. 3. pp. 248–265.

ii. **Versuche über Choleraantitoxin.**—*Ibid.* 1917. Mar. 9. Vol. 26. No. 2. pp. 97–121.

i. In a series of guinea-pig experiments it is shown that guinea-pig leucocytes exert a protective influence against living cholera vibrios, when both are given intraperitoneally and simultaneously. That it is not simply a question of phagocytosis is shown by the fact that protection is also afforded against a toxic extract of cholera vibrios. The only other body cells that show any similar protective power are spleen and marrow cells, but to a less degree. This should argue against a mere physical absorption. The antitoxic action is also demonstrable *in vitro.* Not only is a watery extract of cholera vibrios rendered atoxic, but the leucocytes themselves after combining with the toxin do not part with it on transference to the peritoneal cavity of a guinea-pig. Living cells are more effective than those killed by either heat or cold. An extract of leucocytes could not be shown to possess protective power. Cells and toxin were seen to combine according to the law of multiples. With the aid of this simultaneous injection of leucocytes and extract it was possible to actively immunise guinea-pigs and obtain a serum with a considerable degree of antitoxicity, but used therapeutically the serum only protected effectively against the acute effects of a cholera toxin injection; a lethal marasmus usually supervened about the 5th or 7th day.

It has not been found possible to actively immunise rabbits in the way it has been possible to do with guinea-pigs.

ii. In the second paper the author describes further experiments; he succeeded in immunising a sheep and found its serum capable of protecting against cholera toxin (watery extract) according to the law of multiples and even to some extent against infection with the living organism; the serum had also anti-haemolytic powers.

The cholera strain used in the experiments (V. Kadikjöji) produced haemolysin plentifully and from its toxicity and agglutinating properties is to be regarded as of the El Tor type.

H. S.

Schoebl (Otto). i. **The Relation between the Amount of Cholera Culture injected into the Gall Bladder and the State of Cholera Carriers in Experimental Animals.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1916. July. Vol. 11. No. 4. pp. 153–155.

ii. **The Influence of Bile upon the Duration of the State of Cholera-Carriers in Experimental Animals.**—*Ibid.* pp. 157–158.

i. The carrier state was produced in guinea-pigs on inoculating into the gall bladder as small a quantity of cholera culture as $\frac{1}{100,000,000}$ of a slope, but the duration of the condition was not shown to be dependent on the amount used.

ii. Thirteen guinea-pigs were inoculated with cholera (1/10 slope into the gall bladder); seven received 1 cc. of ox bile per os every third day and on being killed between the 16th and 35th day were all found to harbour vibrios; the remaining six receiving no bile were found, when killed at similar intervals, not to be carriers in three of the cases. The administration of bile as chologogue has apparently rather encouraged than inhibited the presence of cholera vibrios in the gall bladder. [It is to be remembered that throughout conclusions are based on very small numbers of experimental animals.]

H. S.

BOCCOLARI (Antonio) & OLIVI (Girolamo). **Il terreno di Aronson per la diagnosi del colera.** [Aronson's Medium.]—*Ann. di Med. Nav. e Colon.* 1916. July-Aug. Year 22. Vol. 2. No. 1–2. pp. 13–21.

After giving a short review of Aronson's medium and some of those based on it, the authors declare the Castelli-Vigano modification (6 per mille trypsinised casein in place of Aronson's 10 per mille Witte peptone) to be superior to the original medium. Laboratory cultures were employed to test the selective powers of the media. [No quantitative experiments were apparently carried out.] It is suggested that a thermostat kept at 39°–39·5° C. would give a more rapid reddening of the cholera colonies.

H. S.

GREIG (E. D. W.). **The Serological Investigation and Classification of Cholera-Like Vibrios isolated from Water in Calcutta.**—*Indian Jl. Med. Res.* 1916. Apr. Vol. 3. No. 4. pp. 628–637.

The paper treats shortly of some 39 strains of cholera-like vibrios isolated from tanks, wells, ponds and rivers in Calcutta. They were morphologically like *V. cholerae*; all produced indol and liquefied gelatine, but all were haemolytic and the majority were not salted out by a saturated solution of magnesium sulphate and none was agglutinated by high titre cholera sera (one exception) and none on injecting into rabbits produced agglutinins for the Koch bacillus (two exceptions).

By cross agglutination with the various sera prepared from the different strains, all but seven could be relegated to six groups. Included in the seven independent strains were the two exceptions mentioned above which the author considered to be possibly altered Koch bacilli as one underwent a change *in vivo* ranging it more closely alongside *V. cholerae* [this *Bulletin*, Vol. 8, p. 167], and the other agglutinated to some extent with a high titre cholera serum and also produced agglutinins for Koch bacillus when inoculated into rabbits, though not equal in amount to the homologous agglutinins.

H. S.

GAIANI (Dante). **Contributo alla conoscenza dei vibrioni acquatili.** [Water Vibrios.]—*Ann. d'Igiene.* 1917. Feb. 28. Vol. 27. No. 2. pp. 89–99.

Looking for vibrios in the food and water supply of Modena at a time when a few cholera cases were in the military hospital, the author found four strains in so many wells, but none did he regard as the Koch bacillus. Slight morphological differences, in some cases the absence of indol production, and in all atypical agglutination reaction were the negativing characteristics.

H. S.

GAEHTGENS (W.). **Beitrag zur Frage der Differenzierung von cholera-ähnlichen und Cholera-vibrionen.** [The Differentiation of Cholera and Cholera-Like Vibrios.]—*Cent. f. Bakt.* I. Abt. Orig. 1916. July 31. Vol. 78. No. 3. pp. 197–207.

Examining 43 true cholera and 147 cholera-like strains, the author found that in glucose, saccharose and maltose agar stroke cultures, the cholera vibrio generally converted the preliminary acid reaction into an alkaline one after about 10 days or not at all, while the cholera-like vibrios generally produced this change between the 3rd and 7th day. As the table shows the cholera-like strains atypical in this respect were found to be in every case old cultures; that the oldest strains of all (1893–1897) included no atypical ones is considered as being due to their smallness of numbers.

Cholera-like Strains.

Year of Isolation.	Total number.	Reaction on Sugar Agar.	
		Typical.	Atypical.
1893	6	6	—
1895	4	4	—
1896	1	1	—
1897	1	1	—
1905	10	4	6
1906	5	3	2
1907	2	2	—
1908	6	6	—
1909	10	5	5
1910	12	8	4
1911	17	10	7
1912	24	24	—
1913	33	33	—
1914	4	4	—
1915	12	12	—
Total	147	123	24

Similarly it would seem that it is only the older cholera strains that tend to an early alkalinity.

An attempt to show that the typical and atypical groups of cholera-like strains correspond to two serological groupings was unsuccessful. The serum of a typical strain agglutinated relatively more atypical than typical strains, while that of an atypical strain reacted with both types equally well, but in both cases it was but a small proportion of the total number that responded at all.

H. S.

MORISON (J.) & FOX (E. C. R.). **Detection of the Origin and Mode of Spread of an Epidemic. Diarrhoea, Dysentery, and Cholera in Poona.**—*Indian Jl. Med. Res.* 1916. July. Vol. 4. No. 1. pp. 49–73. With 6 charts & 3 maps.

In the course of this detailed paper it is pointed out that the cholera outbreaks in Poona during 1914 were water-borne and originated in cases occurring in the catchment area; there was no statistical evidence of a house to house infection; marked correlation existed between rainfall in the infected areas and incidence of the disease in Poona.

Subsequent treatment of the Poona water supply with hypochlorite of lime resulted in the absence of an epidemic the following year.

H. S.

VON VERESS (Franz). **Typische Varizella und Varioloisfälle im Anschluss an Choleraschutzimpfung.** [Typical Varicella and Varioloid Cases after Cholera Inoculation.]—*Dermatol. Woch.* 1916. Aug. 26. Vol. 62. No. 34. pp. 809–812.

During a small outbreak of variola, varicella and varioloid cases on the Styrpa front, five among the two latter types followed cholera vaccination within 2–5 days. The author, believing they stood in relationship to the inoculation, supposes that a negative phase had resulted and even affected the resistance of the men to the heterologous infecting agents of varicella and varioloid.

H. S.

NEHRKORN. **Tiefe Eiterung nach Choleraschutzimpfung.** [Deep Abscess Formation after Cholera Inoculation.]—*Münch. Med. Woch.* 1917. Apr. 3. Vol. 64. No. 14. pp. 473–475.

A case of chronic suppuration after cholera inoculation occurring in the chest wall and involving ribs and sternum is described. The process has been going on for over a year and although the inoculation is regarded by the author as the occasion of the trouble, he is undecided as to its ultimate aetiology. No conclusive evidence of tuberculosis, actinomycosis or syphilis was discoverable.

H. S.

BERTARELLI (E.). **I postumi e le complicanze del colera.** [Cholera Sequelae and Complications.]—*Morgagni.* 1916. Oct. 27. Vol. 58. Pt. 2. No. 61. pp. 973–976.

Attention is drawn to pneumonia, pleurisy, parotitis, metritis, etc., occurring after cholera asiatica and, while disbelief in *V. cholerae* as the causative agent is expressed, it is pointed out that the aetiology is still a matter of doubt.

H. S.

MISCELLANEOUS.

ROGERS (Leonard). **Annual Address delivered to the Asiatic Society of Bengal.**—*Proc. Asiatic Soc. Bengal.* 1916. July. Vol. 12. No. 2. 8 pp.

The subject of Sir Leonard Rogers' address was "Some Therapeutic Advances made in India and the Need for Further Investigation of Indigenous Drugs." He gives in some detail the history of the introduction of cinchona bark and quinine and their employment in India, and that of ipecacuanha and emetine. Cinchona bark was used in Calcutta by BOGUE, in the fatal fevers of the rainy season, as far back as 1657 and a century later it was given with much success by LIND. In 1804 James JOHNSON "as a result of the loss of a single case" condemned the bark as useless and introduced copious bleedings and salivation with mercury. Though quinine was introduced into India in 1825 the use of mercury continued for forty years. In 1842 HARE was struck with the unsatisfactory results thus obtained in the Nepal Terai and, as a result of coming across the works of LIND and HUNTER, tried quinine in large doses; i.e., as cinchona had been given. In 1847 he published a pamphlet on the quinine treatment which led to his being brought to Calcutta, where he reduced the death rate from fevers to "one-twelfth of its average rate for the previous twenty years." HARE's system of treatment has been used ever since.

The history of the introduction of emetine is now familiar. Rogers points out how well the story of quinine and emetine, the latter of which was discovered in 1817, illustrates the value of researches on pharmacology and therapeutics. He comments on the poor facilities which have hitherto existed for such researches in India.

A. G. B.

BELLI (C. M.). **La profilassi navale del tifo esantematico, febbre gialla, peste, colera, tifo addominale, scorbuto e beri-beri, alla luce delle nuove dottrine.** [Prevention on Board Ship of Typhus, Yellow Fever, Plague, Cholera, Enteric Fever, Scurvy, and Beriberi, in the Light of Modern Knowledge.]—*Ann. Med. Nav. e Colon.* 1916. Nov.-Dec. Year 22. Vol. 2. No. 5–6. pp. 522–567.

An article discussing the modern methods of dealing with the above-mentioned diseases on board of men-of-war. Most of the material would be found in any modern text-book of naval hygiene. Points in the author's paper worth noting are the following:—

Plague.—This gives but little trouble on board of men-of-war because there are no cargoes for rats to harbour in, and because men-of-war are seldom tied up to wharves in commercial ports.

Typhus.—The agglomeration of men in the crew of a man-of-war makes lousiness difficult to eradicate when it once takes hold of a crew, and creates proportional difficulties if typhus gets on board. The trouble is most likely to occur if men-of-war or naval transports are used for the conveyance of military prisoners to a destination.

Dysentery and *cholera,* in the same way, are most liable to break out when soldiers or prisoners are shipped. All the cases of *beriberi* occurring on Italian naval vessels, of which four instances are given, were traceable to the use of tinned provisions. One of the vessels had been stationed off the coast of Brazil for a long time, and two others off the coast of Zanzibar for periods of six and nine months respectively. *Enteric fever* is generally contracted on shore and brought on board by drafts of men from naval ports and barracks.

J. B. Nias.

LAMBIE (T.). **Brief Notes on the Clinical Features of Diseases Prevalent in Upper Nile and Sobat Pibor District.**—*Jl. Trop. Med. & Hyg.* 1917. Mar. 15. Vol. 20. No. 6. pp. 61–62.

"Here are two almost distinct medical districts as regards the diseases most commonly found." The Shilluks of the Upper Nile are infected to the extent of 50 per cent. with a disease which the author believes to be yaws. Syphilis is also rampant and the two are hard to distinguish. "Both conditions yield readily to large doses of potassium iodide or to salvarsan or any of its modifications." In the Pibor Sobat district one of the most common diseases is "a most destructive and virulent rhino-pharyngitis . . . involving all adjacent tissues, be they skin, connective tissue, bone, muscle or mucous membrane." It can be checked by local applications of strong tincture of iodine and exhibition of huge doses of potassium iodide; mercury is useless. "The other most prevalent disease is a gummatous periostitis, accompanied with great emaciation, pain and prostration. The bones most frequently affected are, in the order named: tibia, radius and ulna, frontal." Sometimes nearly the whole bony system is affected. Frequently the bony masses break down and discharge pus. This also the author is inclined to ascribe to syphilis, but "the surprising point is this, that in the Sobat Pibor district we never see either syphilis or yaws, or, at least, we do not see the primary or secondary lesion of either, just as in thousands of cases examined in this district not more than a paltry dozen or so venereal sores have been seen, and these were tertiary lesions or else the lesions of some other disease, like lepra."

The author thinks that either (1) a widespread attack of syphilis has died away, leaving only tertiary and congenital lues; or (2) the type of syphilis is different to that usually met with; or (3) that the condition is not attributable to syphilis.

Other diseases common to both districts are—trachoma with entropion, leprosy, amoebic dysentery, pneumonia, guineaworm and malaria. The author states that he lacks all laboratory facilities.

[The author is physician to the American Mission, Sudan; it seems surprising and, if one may venture to say so, reprehensible, that the authorities of this Mission leave him in the state of comparative helplessness revealed by the last sentence.]

A. G. B.

LEYS (Norman). **Notes on Two Diseases observed in Karonga, Nyasaland, during the Period 1914–1916.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Feb. Vol. 10. No. 4. pp. 67–81. With 1 plate & 9 charts.

The first disease described by Dr. Leys was met with six times in hospital and many times among out-patients during the author's stay of two years and three months at Karonga. Its chief character is great enlargement of the spleen and usually of the liver also.

"The disease is one of later childhood, adolescence and early middle age. I have not seen a case in an infant, nor in any one over 40. Cases have come to me from all round Karonga, but there is a special focus of the disease in the villages on the banks of the Rukuru. I collected over a dozen cases in children aged 5 to 15, from within a half-mile radius, two miles up the Rukuru from Karonga. So far as I can judge, most cases die. I know of no death in under two years from the onset of symptoms. I have seen several cases which I believed to be certain to recover. . . . One boy, with the usual enormous liver and spleen, has been constantly at work in the Regimental Store of the King's African Rifles for the last 18 months.

"The onset of the disease is generally insidious in nature. Some histories suggest that the real onset is preceded by several ephemeral attacks of fever. Throughout the course of the disease fever is almost constant, with morning remissions. Weakness, anaemia, and abdominal enlargement come slowly. When fully developed, the enlargement is very characteristic, especially in children. The lower ribs and upper abdomen bulge out on both sides, allowing cases to be picked out by the eye in a crowd of naked villagers. . . .

"The liver is not always enlarged. I have seen both advanced and early cases with no liver enlargement; but when splenic enlargement is not excessive, and when it is not accompanied by hepatic enlargement, it is impossible, without repeated blood examinations, and without watching the results of quinine, to be sure cases are not malarial. In one village, out of 69 children, 67 had enlarged spleens. Of the infants none had markedly enlarged livers. The eight children with enlarged livers were all over 4 years old. In other nine the degree and direction of splenic enlargement were against the diagnosis of malaria. Malarial spleens that I have seen rarely pass far beyond the umbilicus. In the present disease the enlargements of liver and spleen are characteristic in shape and direction. The spleen enlarges in the direction of the spine of the ilium—I have in two cases been unable to get my fingers between the organ and Poupart's ligament. The liver, while enlarged in all directions, is often most prominent near the middle line. The left lobe is then separately palpable and often makes a special prominence below the xiphoid, visible to the eye. . . .

"A thin and flaccid abdominal wall is a notable feature of the disease . . . Many children with the disease get very thin, but adults are always well covered. General oedema develops for some time before death."

The disease has a characteristic and very uniform blood picture. Leys has seen no case "where the large mononuclear count was under 27 per cent. Many of these are always of the large lymphocyte type, some very large, with scanty deeply staining cytoplasm. "A degree of lymphocytosis is always present." Estimations of red or white cells were not made. One case which occurred in a member of the Field Force, who had left Zomba 11 months, was under observation from July to January and a complete record of the morning and evening temperatures is given. In the first month the temperature was 103°–105° in the evening and 99°–101° in the morning. On admission the spleen was just palpable; three months later its edge was an inch above the umbilical level. The liver, which began to enlarge in August, was then two and three-quarter inches below the ribs in the nipple line. In October there was oedema of the legs. The charts show a very small decline of temperature from the first month; in December it was almost steadily normal, but in January, when the man was sent home, the fever returned. The differential blood count on four occasions is given.

Leys has not met with this disease in 15 years of practice elsewhere in East Africa and Nyasaland. Gastro-intestinal disturbance and emaciation are not features. The spleen was punctured once, the liver twice, without the discovery of leishmania.

The second disease described is defined as "multiple non-suppurative swellings of connective tissue."

> "The swelling may occur literally anywhere in connective tissue, inside joints, under periosteum, in muscle (the commonest site of all), or just under the skin. They may be single but are more often multiple. When multiple they may arise and resolve together or they may succeed one another, often overlapping in point of time. Some of the first cases I saw suppurated. That result I now attribute to mistaken treatment, particularly the use of liniments or fomentations. After I confined treatment to the immobilising of the affected part, none of the swellings suppurated. . . . The one essential treatment is to immobilise."

Illustrative cases are given. The author for long suspected the swellings were filarial but is now sure they are not; he has examined the blood of most.

He briefly describes an organism found during routine stool examinations, usually associated with diarrhoea.

[Those interested in the disease first described should consult this *Bulletin*, Vol. 1, pp. 112–4; Vol. 3, p. 228; Vol. 5, pp. 384–6.]

A. G. B.

STUTZIN (J. J.). **Tropenchirurgische Beobachtungen, besonders bei Kriegsverletzten.** [Surgical Observations in the Tropics, especially among Wounded Soldiers.]—*Deut. Med. Woch.* 1917. Mar. 22. Vol. 43. No. 12. pp. 366–367.

The author, who was in charge of the German Red Cross Expedition to Bagdad, gives an account of complications to which the wounded were subject in a climate where from May to August the temperature reaches 50° (122° F.) and more in the shade and even at night time frequently exceeds that of the body. Patients confined to bed soon suffered from eczema and boils. The body lies in a bath of sweat. He instances a case of whitlow in which a few hours after the application of a wet dressing the skin became macerated, and boils developed and spread over the whole of the body, simultaneously with acute eczema which occupied the upper part; these complications lasted two months longer than the whitlow. He has seen several cases of severe unexplained heart collapse in sick European soldiers, three of which (two in officers) were immediately fatal. After operations bronchitis was common, attributed to the increased secretion of the bronchi and the lessened evaporation. Great rises of temperature were not infrequent. The author says he can vouch for one of 43·5° (110°) in the axilla before death. The fly plague was great.

A. G. B.

CHAMBERLAIN (Weston P.). **Demography in so Far as it Relates to the Vital Statistics of Armies.**—*Milit. Surgeon.* 1916. Dec. Vol. 39. No. 6. pp. 583–590; 1917. Vol. 40. Jan. Feb. Mar. Nos. 1, 2, 3. pp. 37–44. 204–210, 303–309.

In this long paper those parts are here considered in which comparisons are made between the coloured and white troops of the

American army in the American continent and the Philippine Islands respectively. The author points out that "the deductions drawn from the statistical tables of the reports of the Surgeon-General of the Army for white and colored troops are especially valuable, since they show comparative rates for adults of the two races whose ailments are diagnosed with equal care and whose sanitary surroundings are identical."

Figures are given also for the Filipinos, of Malayan race. The mean strength of the whites for the decade was 59,837; the negroes (in all cases American born) and Filipinos averaged 2,240 and 5,050 respectively. The table which follows (Table I) is a composite one made up from numerous tables in the text, each of which shows the admissions per mille for the two or three races in each year of the decade 1905 to 1914; the differences in the figures given above should make one cautious in drawing conclusions from it. The negroes showed a mortality on the mainland of 5·1 per mille against 2·7 for the whites, and in the Philippines of 5·5 against 3·2 per mille (see Table II); it is stated that this agrees with the experience of southern communities in the United States.

TABLE I (Composite).

Admission Rates per 1,000 for Whites, Negroes and Filipinos of the American Army for the Decade 1905–1914.

	U.S.A.		Philippines.		
	W.	C.	W.	C.	F.
Diseases only	745	602	1,114	1,214	811
General Diseases ..	315	242	589	612	427
Digestive Diseases ..	174	130	217	226	147
Genito-Urinary Diseases (not including venereal diseases)	12	13	15	16	5·9
Circulatory Diseases ..	21	23	33	34	9·9
Heart Diseases	2·2	3·4	1·4	3·0	0·85
Chronic Nephritis ..	0·69	0·93	0·36	0·54	0·25
Dysentery	—	—	31	24	12
Acute Artic. Rheum. ..	8·1	9·1	4·1	8·1	3·6
Chronic Rheumatism ..	4·1	7·1	3·3	8·2	0·8
Insanity	2·2	2.4	2·6	2·1	0·8
Nervous Diseases ..	15	17	18	21	7·4
Respiratory Diseases ..	71	67	45	69	54
Bronchitis	39	33	23	41	38
Tuberculosis	3·2	4·0	5·0	6·7	5·2
Pneumonia	2·7	4·3	1·1	2·8	2·5
All Venereal Diseases ..	142	147	270	364	55
Syphilis	26	25	47	37	5·1
Malaria	22	8·2	156	53	280
Alcoholism*	24	7·6	—	—	—

W. = white; C. = coloured; F. = Filipino.

* American Army as a whole; the rate for Filipinos was 0·5 per cent.

TABLE II.

Morbidity and Mortality Rates per 1,000 for Diseases only, among American and Filipino Troops serving in the P.I., 1905–1914.

	W.	C.	F.
Admissions..	1,114	1,214	811
Disability discharges	8·6	8·4	8·2
Deaths	3·2	5·5	4·8
Constantly non-effective	42	40	24

"An opinion that the higher mortality among negroes is in part, at least, a purely racial difference, and not due entirely to unfavorable sanitary conditions, appears to be supported by the experience of the last ten years in our Army where the housing, clothing, feeding, and most other hygienic factors are identical for the white and the colored soldiers."

The following remarks are comments on Table I. The figures given for "circulatory diseases" support WILSON who tabulated reports for various southern cities from 1909–1913 which indicate that the death rates for diseases of the arteries, including aneurism, is considerably higher for negroes than for whites; for diseases of the heart he found the excess of negro over white deaths to be uniformly very great and the same was true of acute and chronic nephritis. The case mortality for pneumonia in the Surgeon-General's tables was 7 per cent. for whites, 12 per cent. for Filipinos, and 18 per cent. for negroes; similar figures are given from the Rand (GORGAS) and the Panama Canal Zone (HOFFMAN). With respect to the view of GORGAS that the high mortality among recently arrived negroes on the Rand and in Panama is a question of immunity [see this *Bulletin*, Vol. 5, p. 314], the author writes:—

"That the question of crowded barracks and recent arrival in an endemic center of pneumococcus infection is not the only factor in the racial incidence of pneumonia appears probable in view of the greater prevalence among negroes in our military service in the last decade. The negro soldiers occupy the same barracks as do white soldiers, have the same air space, and have spent their lives in a country where pneumonia is endemic. Yet they show much higher rates than white men."

The figures for "all venereal diseases" are "of special interest and value because for the major portion of the decade all troops, of whatever race, have been subjected to bi-weekly physical inspections." There are no recent figures for yellow fever, but the statement is of interest that "in 1898 the admission rate for yellow fever in our Army was about five times as high for colored men as for whites." For typhoid [paratyphoid is not mentioned] complete figures are not given; for the years 1904–1909 (United States) "the admissions were very much greater every year for white men, the average being nearly five times as great." As to malaria the latent infections of adult natives have to be remembered: they may be put at 23 per cent. (CRAIG). The high rate for Filipinos may be noted; no explanation is offered. Frost bite was about five times as common among negroes as among whites, sunstroke about twice as frequent among whites as among negroes. Mortality for smallpox was much higher for negroes

than for whites. [The figures in Table I. for acute and chronic rheumatism in the Philippines are remarkable in that the former exceed the latter. Were they really cases of acute articular rheumatism or is " rheumatism " here synonymous with " arthritis ? "]

Under heading, " Acclimatisation of Soldiers," the author writes: " We may live to see the day when acclimatization will be merely a question of enforcing sanitation." This section is an interesting one. A summary of the more important racial differences is given. Most of these can be deduced by the reader from Table I.

A. G. B.

MADRAS. **Annual Report and Statistics of the Government General Hospital, for the Year 1916.** 69 pp. 1917. Madras: Printed by the Superintendent, Government Press. [For Official Use only.]

The average number of beds occupied daily was 379 and the total number of in-patients treated was 7,919, of whom rather more than a quarter were Europeans. The Europeans treated in the out-patient department were fewer by 4,000 than in 1915, which year showed a similar decrease over 1914; it is pointed out that 1916 was a particularly healthy year in Madras City [but without data in regard to population no inference can be drawn]. Malarial fever again decreased; there were 7,495 admissions, against 8,821 in 1915, and 9,118 in 1914. Enteric fever also decreased both amongst Europeans and Indians [cf. this *Bulletin*, Vol. 8, p. 371].

A table is given of the " extras " in each of the years 1913–16 with the quantity expended and the cost; in 1916 " the gradually increasing extravagance " was eliminated with no inconvenience to any patient and " this resulted in the saving of about Rs.26,595 "; the reductions on which the most saving was effected were in milk, eggs, coffee and sugar. The average cost in diet was for Indians 4a. 10p., for Europeans 9a. 6p. per head per day. Under heading Sanitary Department it is noted, " there is no water carriage system and the provision of such a system is one of the most urgent necessities of the hospital."

Quinoidine was used instead of quinine in the First Physician's wards " in a number of cases of malaria " and was found to act quickly and efficiently. In the wards of the Fourth Physician ankylostome ova were found in the faeces of 44 Indians out of 892, or 5 per cent.; not in any European or Eurasian; 32 of the infected were coolies.

The Report contains much interesting detail, especially on the administrative side, and tables in profusion.

A. G. B.

ALGÉRIE. **Rapport sur le Fonctionnement de l'Institut Pasteur d'Algérie en 1916,** par Dr. Edmond SERGENT, Directeur.—20 pp. 1917. Alger: E. Pfister.

At this laboratory 14,428 analyses were made during the year; their nature is indicated in a table under civil and military heads for each subject. They comprised 4,380 examinations of stools (military) for the cholera bacillus, 1,628 serodiagnoses for enteric fevers and 1,039 examinations for malaria. Between February and May 4,377

stools of Serbian refugees were examined for cholera and eight carriers were thus found and treated; no case of cholera occurred in Algeria. The number of persons who underwent a complete course of inoculation against rabies was 1,429; in 73 instances the diagnosis of rabies was experimentally confirmed at the laboratory, in 281 the disease was recognised at the veterinary examination and in 1,075 cases there was only a suspicion of rabies. The mortality was 0·14 per cent. The biting animals were dogs 919 (612 masterless); cats, 57; rabbits, rats, jackals, man, 3 each; cows, horses, 2 each; ox, sheep, mule, donkey, fox, 1 each.

Malarial Service.--In 1916 the spring rains were very heavy, especially in the Mitidja plain; there followed an explosion of severe malaria. Inhabitants of places free since the memory of man suffered. The disease was kept in check where quinine was distributed daily, not where it was taken every three or four days; daily administration is essential. The forms used were the hydrochloride in dragées, and the tannate and sulphate in " chocolatines "; these were prepared at the Institute.

Service of Serums, &c.—Of anti-small-pox vaccine 892,005 doses were turned out, of anti-enteric 89,035 doses, of anti-cholera 201,550 doses, and lesser quantities of other products for medical use. Figures of products for veterinary use, diagnostic reagents, etc. are given. Under the heading Missions, it is stated that the brothers SERGENT were sent by the Ministry of War to the Eastern Army to establish an anti-malaria campaign. An account is given of the researches published on various subjects.

A. G. B.

ANTIOQUIA. **Informe del Superintendente General del Ferrocarril de Antioquia para la Asamblea de 1917.** [Report of the General Superintendent of the Antioquia Railway to the General Meeting of 1917.]—pp. 88–107. With 3 charts. Medellin. República de Colombia. Imprenta Oficial.

This is an extract from the annual report of the above railway, giving the medical statistics for the year 1916, compiled by the Chief Medical Officer, Dr. E. HENAO, M. The total mortality among the employés for the year 1916 was 6·84 per mille, as compared with 8·60 for the year 1915, and 8·82 for 1914, of which figure 5·60 was contributed by disease, and 1·24 by accidents. Malaria contributed by far the largest amount of illness. There were 20 cases of enteric fever with two deaths, the infection having been imported from outside.

J. B. N.

LUENGO MARCOS (Pablo). **Los estudios de parasitologia en España.** [The Study of Parasitology in Spain.]—*Siglo Med.* 1917. Feb. 3. Vol. 64. No. 3295. pp. 67–69.

A résumé of the work done in recent years by Spanish medical men in the study of parasitic diseases. The principal name that occurs is that of Dr. PITTALUGA, who organised the first expedition for the study of tropical disease in Spanish Guiana, of which the report was published in 1911. As the result of this report a chair of Tropical Pathology and Parasitology was established in the University of Madrid, to which Dr. PITTALUGA was appointed. Summaries have appeared in this *Bulletin* from time to time of many of the principal memoirs published in Spain during the last few years on tropical diseases.

J. B. N.

BREINL (A.) & PRIESTLEY (H.). **Note on the 'Arneth Count' in Healthy Aboriginal Children of Northern Australia.**—*Ann. Trop. Med. & Parasit.* 1917. Feb. 8. Vol. 10. No. 4. pp. 427-430.

The authors refer to their publications on the Arneth count in healthy children living in Tropical Queensland and in adults and children, more or less infected with yaws and malaria, in New Guinea [this *Bulletin*, Vol. 5, p. 372, Vol. 7, p. 336]. The greater shift in the New Guinea children than in either of the other groups was attributed to the diseases named. In the present instance the counts were made on the blood of forty healthy children on Melville and Bathurst Islands, off the north coast of Australia. The results are expressed in a table which shows also those of the previous enquiries. The figures are:—

For Northern Territory children	71·6
,, North Queensland school children (white)	74·5
,, New Guinea adult natives	74·04
,, ,, ,, native children	83·86

Arneth's figure for normal Europeans was 40.

The authors draw attention to the closeness of the figures of the first three groups. "This close agreement strengthens our conception that the alteration of the blood picture in North Queensland school children can be regarded as an outcome of climatic influences only." They do not share the opinion of Scott MACFIE that "the abortive inoculations with malaria parasites by infected mosquitoes, which are a part of the daily life in many parts of West Africa, are sufficient to account for this shift in apparently healthy Europeans" [*loc. cit.*, p. 338], though in their opinion the higher figure for New Guinea native children may be accounted for by infection. The table gives also the differential counts for each group, and it is seen that the 39 Northern Territory children had 10·5 per cent. eosinophiles.

A. G. B.

MACCONKEY (A. T.). **Note on the Keeping Qualities of Therapeutic Serums.**—*Brit. Med. Jl.* 1917. Jan. 6. pp. 10–11.

A table is given showing the loss of antitoxin which occurred in 31 samples of diphtheria antitoxin which had been in commerce for various periods. There was a loss in unitage in every case but one, varying between 10 and 45 per cent. These serums had been on the market, on an average, for 2½ years and the average loss of unitage was 10 per cent. per annum. The author says that "unless we know how serum has been stored the putting on the label of a time expiry limit tells us nothing and may lead to a false sense of security." The serum, as is well known, should be kept in the dark and in the cold. Tetanus antitoxin loses its strength at about the same rate. Anti-plague serum "when stored under proper conditions changes little in the course of two years." The test "toxin" for anti-dysentery serum at the Lister Institute Laboratories consists of the dry powdered bodies of bacilli of the Shiga type. The serum tested against this appears to retain its "toxin" neutralizing power with little change for at least one and a half years. With regard to diphtheria and tetanus antitoxin it is pointed out that the decrease in strength can easily be remedied by giving larger doses, and to anti-plague and anti-dysentery serum that the distinguishing mark on the bottle should be noted and mentioned in reports.

A. G. B.

McCAY (D.), SATISH CHANDRA BANERJEE, LAL MOHAN GHOSAL, MADAN MOHAN DUTTA & CHARUBRATA ROY. **Observations on the Sugar of the Blood and the Sugar in the Urine in Varying Conditions of Health in the Bengali.**—*Indian Jl. Med. Res.* 1916. July. Vol. 4. No. 1. pp. 1–27.

This is the first instalment of a report from the Physiological Department, Medical College, Calcutta, and the subject with which it deals was a side issue of the enquiry into the causes of the prevalence of diabetes in India, now in progress. Accurate data were required of the normal conditions met with in the Bengali, the variations of those conditions, and how far they are affected by change of diet and the administration of glucose. The present paper treats of the sugar of the blood in Bengalis. The tables demonstrate the thoroughness of the enquiry. It is not possible to give more than some of the conclusions reached.

"1. In Bengalis the average percentage of sugar in the blood is 0·130 which, compared with that given for Europeans, 0·08 per cent. is distinctly high.

"2. The higher average sugar content of the blood of Bengalis is probably due to the excessive carbohydrate material on which they live. This conclusion is borne out by the investigations carried out on the different classes of Bengalis.

"In the poor working classes, and in those who are unable to afford more than sufficient food to meet the daily requirements of the body, and are, therefore, unable to store up fat, the sugar content of the blood is distinctly lower—0·125 per cent., than in the fat indolent classes—0·150 per cent. Further, we have found that a very close relationship exists, other things being equal, between the sugar content of the blood and the degree to which fat has been deposited in the tissues.

"3. In the poor, the working classes, the energetic and the lean types of Bengalis, the administration of even considerable amounts of glucose per kilo. of body-weight has little or no effect in raising the sugar content of the blood, or in causing glycosuria: whereas in the fat, indolent classes exactly the opposite conditions obtain.

"4. The sugar tolerance and powers of carbohydrate utilization of the poor, the working classes, etc., are high, whereas, the fatter and flabbier the individual, the poorer his limits of tolerance.

"5. Sugar tolerance, however, is not entirely a matter depending only on the variable degree to which fat has been deposited. In reality, it is a personal or individual attribute, and depends, in ordinary health, on the effects carbohydrate alimentation may have in raising, or in causing no increase, in the sugar contents of the blood. That is, if the individual be able to prevent the accumulation of sugar in the blood, be he fat or lean, tolerance is high and he has little tendency to glycosuria: whereas, be he fat or lean, if, on the ingestion of a little glucose, the sugar content of the blood rise, tolerance is low and he falls into the class of potential glycosurics. Of course, as shown in the tables, the fat, flabby, indolent, Bengali is far more likely than the lean, hard-working, or poorly-fed, to show a hyperglycaemia and glycosuria on adding equal quantities of glucose to the diet.

"6. In those possessing a high carbohydrate tolerance the sugar content of the blood remains remarkably constant: whereas, when the sugar tolerance is low, the percentage of sugar in the blood is easily raised.

"7. The most feasible explanation of the difference in the powers of carbohydrate utilization shown by different individuals would appear to be the varying efficiency of the glycogenic function of the liver under the several conditions met with."

A. G. B.

PUPO (João de Aguiar). **Dois casos de Blastomycose.** [Two Cases of Blastomycosis.]—*Ann. Paulist. Med. e Cirurg.* 1915. Aug.-Oct. Vol. 5. Nos. 2, 3 & 4. pp. 148–153. With 1 plate.

The author of this paper commences by giving a table, compiled by Dr. O. PORTUGAL, of all the cases of blastomycosis that have hitherto been recognised in Brazil, from the first one described by LUTZ in 1905, down to the end of 1914. The total number is 33. It is noteworthy, as bearing on the etiology of the affection, that out of these 33 cases 32 occurred in males, and that out of the 32 males only two were boys (one aged 10 and the other 13 years). This distribution of age and sex suggests that the disease is almost always due to some traumatism sustained while at work. The avocations of the affected males were in nearly all cases those of manual labour. After giving a short account of the clinical features and pathological anatomy of the disease, the author goes on to narrate two cases of his own.

Case 1. A male, aged 65 years, a labourer by trade. The illness dated back four months. On the right foot there existed a lesion which began as a nodule, situated in the second interdigital space and following upon an intertrigenous eczema at the same spot, which was constantly subject to injury from twigs and bushes, when walking barefoot. This nodule enlarged until it enveloped the third toe and part of the plantar surface of the second one. A sensation of burning was felt in the whole of the affected foot. The surface of the nodule was covered with pink granulations of the size of a pin's head, which gave it the appearance of the interior of a ripe fig. A sero-purulent excretion constantly exuded. The surrounding skin of the foot was warty and elevated, and the lymphatic glands were not infected. A section of tissue removed showed hypertrophy of the epidermis with the formation of pearly nodules, but no giant cells. On Sabouraud's medium, after the lapse of 10 days, a growth was obtained consisting of hard grey colonies covered with a thick white tufted growth. Under the microscope this was seen to consist of thick branching septate mycelia with conidia, represented by oval corpuscles lying separately or grouped at the edge of the mycelium. In older cultivations numerous ascospores were seen, formed of large spherical elements measuring from 8 to 25μ in diameter, surrounded by a thick hyaline capsule and containing from 4 to 6 spores. Intraperitoneal and subcutaneous inoculations of the material, cultivated in Sabouraud's broth, into rats and guinea-pigs were without result.

After the patient had been treated unsuccessfully for a month with iodide of potassium, given internally by the mouth in the dose of 3 grammes daily, a radical cure was obtained by the amputation of the affected toes. The author admits that the microscopic examination of the affected parts in this case was rather incomplete.

Case 2. In this case, which is only described very briefly, an ulcerated nodule had existed for six weeks on the side of the tongue in a man aged 50. In portions of the excised tissue giant cells and blastomycotic elements were found. Treatment was initiated with iodide of potassium.

J. B. N.

Scott (Agnes C.). i. A Contribution to the Study of Osteomalacia in India.—*Indian Jl. Med. Res.* 1916. July. Vol. 4. No. 1. pp. 140–168. With 2 maps.

ii. The Calcium Content of the Urine and Blood with Special Reference to its Variation in the Condition of Osteomalacia.—*Ibid.* pp. 169–182.

i. This paper is the outcome of six months' enquiry into the prevalence and behaviour of osteomalacia in India, during which 83 cases were examined. A series of questions was circulated to 153 hospitals in various parts of the country; of 108 which replied 47 reported cases, the total number being 572; all appear to have been abnormal midwifery cases. The distribution is shown by a spot map.

The author's summary of the results of her enquiries is as follows :—

"1. With the exception of the Gangetic Delta and certain areas in the Madras Presidency, the geographical distribution follows in the main the alluvial tracts. With the exception of Kashmir the disease is absent from areas in which rice is the staple food.

"2. No evidence has been obtained indicating that the chemical nature of the water was at fault.

"3. In the northern parts of India the heaviest affection is amongst the Banias and Khattris [both Hindus in good circumstances]. In western areas the Bohras [Mohamedans] are especially selected.

"4. I have found no record of a case in the male sex.

"5. The mean age of incidence is lower in India than it is in Italy.

"6. The mean number of pregnancies was found to be 3·8. The disease commenced after an average of 2·1 pregnancies.

"7. The mean period of lactation was found to be 2·37 years.

"8. The figures collected with reference to house infection are so few that no definite deductions can be drawn from them.

"9. No interrelation between osteomalacia and either goitre or tuberculosis appears to exist."

ii. This investigation showed that the calcium content of the urine and blood is, *caeteris paribus*, increased in osteomalacia. The calcium increase in the urine becomes a deficiency in the presence of pregnancy or lactation ; that in the blood is unaffected by these conditions.

A. G. B.

Soparkar (M. B.). i. The Cultivation of the Tubercle Bacillus directly from Sputum and Post-Mortem Material.—*Indian Jl. Med. Res.* 1916. July. Vol. 4. No. 1. pp. 29–40.

ii. The Vitality of the Tubercle Bacillus outside the Body.—*Ibid.* 1917. Apr. Vol. 4. No. 4. pp. 627–650.

i. Dr. Soparkar, working in the Bombay Bacteriological Laboratory, finds that a solution of sodium hydrate is capable of rendering sputum or other tubercular material homogeneous and that, if the material is subjected to it for a limited time, micro-organisms other than tubercle bacilli are killed without these being devitalised. At the proper moment the alkali is neutralised by dilute HCl. This method has several advantages over the antiformin method. To obviate the entry of moulds through the plugs of his culture tubes and the drying up of the media he tried various devices. It was not found advisable to cut off access of air because the result was inhibition of growth of the culture. He got the best results from plugging the tubes with sublimated cotton wool (1 in 1,000 or 1 in 500) and then inserting a paraffined cork through the centre of which a small hole had been bored. By these methods tubercle bacilli have been grown from sputa both new and old, pleuritic fluid, and decomposed post-mortem material.

ii. Much experimental research has been conducted in temperate regions on this subject. The work detailed in this paper was done at Bombay, the test of vitality being inoculation into guinea-pigs. The results are fully shown in a series of tables. The author's summary is as follows:—

> "(1). Tubercle bacilli in sputum when exposed to direct sunlight were alive for six hours but dead after eight hours. (2) When the sputum was exposed to diffused daylight they were found alive for six days but were dead after eight days. (3) When the sputum was kept in darkness, even when it was completely desiccated, the tubercle bacilli contained therein were found alive and virulent for 309 days. (4) From decomposing sputum living tubercle bacilli could be isolated after twenty days but not after twenty-six days. (5) Bovine tubercle bacilli were found to be more resistant to sunlight and diffused daylight than human tubercle bacilli. (6) When exposed to electric light the bovine bacilli were found alive for 74 days but dead after 100 days. (7) It took three to four hours in direct sunlight and three to four days in diffuse daylight for a pellet of sputum to become sufficiently dried to be capable of being reduced to dust. (8) It is easier to reduce to dust sputum dried on dusty surfaces than on glazed surfaces."

With regard to (7) and (8) the author considers that the danger from infected dust is greater in India than in Europe, "for wet cleansing is very rarely practised in the former country." After the complete drying of the sputum there is an interval during which the bacilli remain alive, and the duration of this depends on the lighting conditions. "The adoption of suitable building by-laws to ensure the entrance of sufficient light and air in all inhabited rooms in houses will do much to combat the spread of tuberculosis."

A. G. B.

ROGERS (Leonard). **The Vaccine Treatment of Asthma in Bengal.**—*Practitioner.* 1916. June. 7 pp.

Rogers points out that Bengal is notorious for asthma. He has obtained "most promising results" by the administration of autogenous vaccines.

> "Cultures were made on glycerine-agar tubes from freshly obtained sputum, two tubes being inoculated from a single loopful, and about six tubes used in each examination to ensure some of the colonies being well separated. On the following day, sub-cultures were made from the fine pneumococcal and streptococcal-like colonies, a number of them being taken up so as to get as many strains as possible in the tubes used for making the vaccine. Occasionally, the culture consisted so purely of fine colonies, that the vaccine could be prepared from the primary culture, but this was exceptional. If the sub-culture was a thin one, it was smeared over the surface with a platinum loop, and reincubated until a uniform thin layer of growth was obtained. Five c.c. of sterile salt solution were added to each tube, which were then heated to from 56° to 60° C. for one hour; half per cent. of carbolic acid was added, and after mixing well, the fluid was put up in doses of half and one c.c. The first dose was half a c.c. which usually contained somewhere about fifty million organisms. If no febrile but only a little local reaction occurred, a dose of one c.c. was

given after five days, and repeated weekly. Occasionally, the dose was increased to one and a half or two c.c., but as a rule this was unnecessary. The technique is thus most simple, and it requires very little apparatus or experience to make the vaccine on these lines."

Diplococci nearly always predominated, streptococci sometimes. Brief notes are given of 13 cases, in nearly all of which much benefit accrued.

A. G. B.

Clapier. **Les porteurs de Kystes filariens (*Onchocerca volvulus*) et de Nodosités Juxta-Articulaires en pays Toma (Région militaire de la Guinée).**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 150–157.

In the Toma country, which separates Liberia from the rest of French Guiana, the affections named in the title are common. They are frequently mistaken for one another, so that it has been even suggested that certain juxta-articular nodules have a filarial origin. The author has tried to establish the signs which are common to both as well as those which differentiate them, the diagnosis being made on clinical grounds and confirmed by puncture or removal of a tumour.

The signs common to both are these: Subcutaneous tumours of slow growth; volume varying from a shot to a mandarin orange; consistence very firm; shape more or less rounded or oval; generally multiple and in groups of 2, 3 or 4 in certain seats of election; tendency slight or none at all to suppuration and ulceration; little or not at all painful to pressure; development indefinite.

Differential Signs.

Volvulus cysts.	*Juxta-articular nodules.*
1. Project slightly under the skin; sometimes invisible even in a good light and discernible only by touch.	1. Projection is clear and often rounded.
2. Skin not adherent, colouration unchanged, freely movable over the tumour.	2. Adhesion to skin common; skin often stretched and sometimes discoloured at the highest point.
3. Consistence firm but elastic, a little firmer than lymphatic glands.	3. Consistence very firm, suggesting wood or pebble.
4. Shape regular, like a millet-seed, cherry stone or olive; a rounded or evenly flattened pebble; an egg.	4. Shape less regular, angles sometimes fairly clear, like a pebble with several faces, a chestnut or Indian corn.
5. Neighbouring tissues not puffy.	5. Neighbouring tissues puffy to a varying degree.
6. Localisation: not clearly connected with joints, epiphyses or points of friction; but inguinal fold, pubis, ribs, scapula.	6. Localisation: by preference on bony epiphyses and outer face of limbs; olecranon, external malleolus, acromion, trochanter.
7. Little tendency to symmetry.	7. Definite tendency to symmetry.
8. Generally movable on the deep parts.	8. Often more or less adherent to periosteum.

Exploratory puncture will confirm the diagnosis; in the case of nodules there will be no fluid or a mere droplet of serum, in that of the cysts a thick viscous greyish, yellow, or orange fluid rich in microfilariae, but sometimes the cysts are multilocular and thickwalled and several punctures are needed. The cyst cavities are partly filled with tangled threads attached to the walls; these are the adult worms; the females are connected with the walls, the males are free. The nodules are white and fibrous on section; there is no cavity.

Juxta-articular nodules.—Of 494 natives examined (235 men; 193 women; 66 children) 14 had nodules, 13 male and 1 female adults. They were situated on the olecranon, 7; great or small trochanter, 4; external malleolus, 3; acromion, 2; iliac spine, 2. Smears stained in various ways showed nothing, and the author does not adduce any hypothesis of the origin of the nodules.

Volvulus cysts.—These were found among the 494 in 14 old men, 26 adult men, 12 adult women, 3 old women, one child of five; a total of 56 or 11 per cent. They were situate on the anterior superior iliac spine 36 times, the ribs 11, the inguinal fold 3, external face of thigh 3, spinal border of scapula 2, mammary region 2, and in various other sites one each.

OUZILLEAU considers *O. volvulus* responsible for many morbid states [see this *Bulletin*, Vol. 1, p. 419]. The author has not succeeded in finding the embryos in the peripheral (day) blood. He does not think the infection modifies the leucocyte count. As a rule the groups of lymphatic glands near the cysts have been larger than those more removed and puncture has discovered the embryos. OUZILLEAU and DUBOIS [*loc. cit.*, Vol. 8, p. 201] believe that this worm is the cause, or a cause, of elephantiasis in the M'Bomou region. However in the Toma country where *volvulus* is so common, elephantiasis is almost unknown. None of the 494 natives had any trace of it. In neighbouring regions the disease is fairly common. The parchment-like skin reported by OUZILLEAU in the cyst carriers was observed by Clapier in carriers of the nodules as well as in old negroes with no cysts. Other symptoms also he cannot attribute to *volvulus.* In fact the pathogenic action appears to be limited to the lymphatic system.

[Juxta-articular nodules appear to have more than one origin,as has been pointed out by JOYEUX [this *Bulletin*, Vol. 3, p. 325]. In Madagascar (FONTOYNONT & CAROUGEAU, 1910) the cause was found to be a species of Nocardia. In Nyasaland a similar condition is believed by DAVEY to be a late manifestation of yaws [*loc. cit.*, Vol. 5, p. 418] and this origin was suggested by MOUCHET and DUBOIS from observations at Leopoldville [*loc. cit.*, Vol. 1, p. 530]. Clapier does not mention yaws in his paper. That there has been confusion in the past between these nodules and *volvulus* cysts is probable. Clapier's lucid tables will aid in their differentiation. See also this *Bulletin*, Vol. 8, pp. 237–9.]

A. G. B.

CHRISTOPHERSON (J. B.). A Large Salivary Calculus from Khartoum, Sudan.—*Proc. Roy. Soc. Med.* **1917. Jan. Vol. 10. No. 3. Sect. of Path. pp. 1–4. With 2 text figs.**

The calculus, which weighed 24 gm. and measured 4·3 by 3 cm., was impacted in Wharton's duct in a Greek; the history went back 18 years, eleven of which were spent at his native place, Cyprus, and the remaining seven in the Sudan. The many physicians consulted had diagnosed it as "gland in neck." The author thinks that "as one might expect in a dry tropical climate like the Sudan, where the excretory and the secretory glands work under a double disadvantage, the maximum amount of activity is required, and the minimum amount of fluid is obtained from the blood, since so much of the blood-fluid is dealt with by the sweat glands, causing concentration in the other secretions of the body. Calculi are hence common amongst the Natives, especially urinary calculi and salivary calculi; ranulae and salivary cysts are also common."

Cases of these conditions are cited.

A. G. B.

SCOTT (H. Harold). **The Vomiting Sickness of Jamaica.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Jan. Vol. 10. No. 3. pp. 47–62.

A very interesting account of the vomiting sickness of Jamaica, the cause of which Dr. Scott has with little doubt discovered. A fairly full account of his investigations was given in this *Bulletin*, Vol. 6, p. 426 and Vol. 7, p. 381. The disease has been known for some thirty years and recently two independent investigations were made, without practical result [this *Bulletin*, Vol. 2, p. 105; Vol. 3, p. 184]. It should be stated that the fact of its ending in complete recovery or death in a few hours rendered the enquiry difficult. Scott was called in 1915 to investigate an epidemic, and noticed that the onset of symptoms was related to the consumption of ackees, the fruit of *Blighia sapida*, which are cooked by boiling with other vegetables. It has long been known that the fruits when unsound are poisonous. He therefore gave watery extracts of such fruits to small animals, and in cats and dogs found the same train of symptoms, the same results—the disease is fatal in 80 per cent. of cases— and the same very definite post-mortem changes as occur in vomiting sickness; herbivorous animals were unaffected. At this stage a case of ackee poisoning in several members of a family came under his notice. The symptoms were those of vomiting sickness and in one case in which death resulted the post-mortem changes were the same. When it is added that many other characters of the incidence and course of vomiting sickness are readily explainable on the ackee poisoning hypothesis it is seen that the demonstration is practically complete.

A point of possible importance is that alcoholic extracts of unsound ackees are not poisonous and that patients seen in the early vomiting stage—the later vomiting is cerebral—have the best chance of recovery by the administration of alcohol, ether, rum, etc. The fatty degeneration of the liver, Scott states, is more acute than in phosphorus poisoning and "opens up the question whether some of the cases reported as yellow fever in West Africa may not be due to the eating of this

In consequence of a warning circulated in the island, during the whole of last year there were only three deaths.

A. G. B.

HULSHOFF (A. A.) & DE LANGEN (C. D.). Klinische en Therapeutische waarnemingen betreffende pneumonieën, in de Centrale Burgerlijke Ziekeninrichting te Batavia waargenomen. [Clinical and Therapeutic Observations on Pneumonia as observed in the Central Municipal Infirmary at Batavia.]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1916. Vol. 56. No. 7. pp. 961–999. With 2 curves.

A study of an outbreak of pneumonia among a certain number of prisoners who were employed on stone-breaking in a local jail at Batavia. In the 12 months from July 1914 to June 1915 inclusive, there occurred 358 cases of pneumonia with 135 deaths, giving a mortality of 37·5 per cent., out of a total number of 3,093 patients treated. An investigation showed that by far the greater number of the patients had been employed on stone-breaking, and that, in addition, the block in which they were lodged was ill-built and unsanitary. The dust arising from the process of stone-breaking is incriminated as having been the principal factor in causing the outbreak. On taking precautions, such as watering the stone dust and increasing the distance between the prisoners in the yards, the number of cases began at once to diminish. In addition, all prisoners employed on stone-breaking were lodged in a more sanitary building. The drop in the number of cases ensuing is shown graphically in a chart. Mention is made of jaundice as particularly common among the cases, which is attributed to the large proportion of patients who had suffered from malaria, and had in consequence enlarged livers and spleens. A series of comparative trials was made with different methods of treatment, with results as follows:—

	Cases.	Mortality.
Ordinary symptomatic treatment ..	263	.. 40·7 per cent.
Menthol-eucalyptus injections (after BERLINER)	92	.. 29 „ „
Optochin injections	66	.. 27·3 „ „

J. B. N.

SEYFARTH (Carly). Tropische und subtropische Süsswasserblutegel als Parasiten im Menschen. [Tropical and Subtropical Fresh Water Leeches as Human Parasites.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Jan. 30. Vol. 79. No. 2. pp. 89–96. With 1 plate.

The author states that leeches are found as parasites of man, causing more or less serious symptoms, in Bulgaria and the Balkan Peninsula as well as in Asia Minor. He gives one case from his own experience in Bulgaria, a second from that of another German surgeon and three published last year. In his own case the patient drank from a spring during a night march, and from that time had pain in swallowing and shortness of breath, and coughed up blood. When he came under observation ten days later he was very anaemic, his voice was hoarse, and he complained of intractable cough, shortness of breath, difficulty in swallowing and continual bleeding from the mouth. With the mirror when the vocal cords were separated a gray-blue foreign body was indistinctly seen in the trachea. A Bulgarian surgeon tried to remove it through the mouth, as he had done before in similar cases, by touching it with concentrated salt solution but this and further attempts failed. Ten days later the man's condition had altered for the worse and after another two days his voice was lost completely. The leech was then removed by splitting the larynx under local anaesthesia. It was found to be hanging from the vocal cords. Three days later the patient died; the autopsy showed lobular pneumonia, haemorrhagic infarcts in the lungs, and purulent bronchitis. The leech was a fine specimen, 12–15 cm. long, of *Limnatis nilotica* Savigny, and is figured.

In the second case a Bulgarian peasant, 14 days before admission, drank at a ditch in the dark and lay down to sleep. Three hours later he awoke with pain in the mouth and found that leeches had fastened therein. With the help of a comrade he removed eight. On the succeeding days he vomited blood and had pain in the neck and hoarse speech, relieved by the extraction of two leeches, one from the back of the pharynx, the other deep in the oesophagus.

The rest of the paper contains an account of the literature followed by two pages of references.

A. G. B.

OLIVER (B. Chone). **Scorpion Bite.**—*Medical Missions in India.* 1916. July. Vol. 22. No. 86. p. 71.

The author, writing from S. Rajputana [under an unfortunate title], says that by accident it was discovered that the application of Tinct. Ferri Perchlor. to a lesion of the skin over the swelling following a scorpion sting promptly relieves pain. This treatment has been applied in several instances, the skin being first scratched.

A. G. B.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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HELMINTHIASIS.

HALL (Maurice C.). **Apparatus for Use in examining Feces for Evidences of Parasitism.**—*Jl. Lab. & Clin. Med.* 1917. Feb. Vol. 2. No. 5. pp. 347–353. With 3 figs.

The examination of large samples of faeces is necessary for the detection of slight infections with helminths; especially in the case of tapeworms, where eggs may not occur in the faeces and the diagnosis depends on the recovery of detached segments from the faeces. The author had reviewed the various methods for the examination of stools in the *Bulletin of the Bureau of Animal Industry*, No. 135 (1911), and had recommended the use of a " milk-shaker " for the comminution of the faecal samples. A newer type of mixer is now described as an improvement on the old on account of its rapidity and noiselessness of action. New types of sieves and screens are also advocated. In microscopical work the extra comfort and reduction of eye strain from the use of curtains and a head rest are emphasised.

R. T. Leiper.

TANAMI (K.). **[A Simple Method of Concentrating Parasite Eggs.]**—*Jikwa Zassi.* 1916. Sept. 20. No. 196. p. 107. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 173.]

A simple and inexpensive method for the collection of eggs from faeces is recommended. A small test tube is poured nine-tenths full of saturated salt solution and a bit of faeces is introduced with a slender rod. It is mixed thoroughly and the tube is then filled up with the salt solution. The eggs float on the top and much of the other material sinks to the bottom of the tube.

R. T. L.

SHIRCORE (J. O.). **Notes on the Prevalence of Intestinal Parasites in East Africa.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Apr. Vol. 10. No. 6. pp. 101–108.

During 1914–16 the author made a series of microscopical examinations of the faeces of native East Africans attending the Hospital at

Mombasa, of Indians of the Expeditionary Force and Washihira Arabs of the Arab Rifles. In all 1,500 observations gave 51·8 per cent. positive for helminth infection. Tables are given showing the incidence of particular species of worms in the various tribes. The author remarks on the high infections with *Taenia saginata* among certain tribes who eat their meat practically raw. The Nilotic Nubi show an infection with *Schistosoma mansoni* of 30·7 per cent. [But this is from a total of 13 examined.] *Strongylus* [*trichostrongylus*] *subtilis* was found in three Indians and one African, *Hymenolepis diminuta* in one Arab and *Hymenolepis nana* in an Indian and a Cape boy.

R. T. L.

MUMETA. **[Notes on the Intestinal Parasites found in Whanghai Province, Korea.]**—*Chosen Igaku Kai Zassi.* 1914. Feb. 15. No. 9. pp. 1–16. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 70–71.]

A series of Korean soldiers [number not stated] were found infected with hookworm ova to the extent of 64 per cent. In a group of students only 14 per cent. were infected. Primary students showed 69 per cent. while those of the higher agricultural school gave only 15·5 per cent., age apparently explaining the difference. The farmers of the province gave a positive result in 65 per cent. The workers in dry fields were much less frequently infected than those who worked in the rice fields, the difference being due, it is thought, to the character of the fertiliser used. The number of worms in any one person did not exceed ten. From measurements of the ova the author seeks to establish also the presence of *Necator americanus* but no adults are reported. In 12 per cent. tapeworms occur and in the eggs alone these are determined as *Taenia mediocanellata* [*T. saginata*] and *Taenia solium.* (Dr. MILLS adds however that *T. saginata* "is almost the only tapeworm found in Korea.")

R. T. L.

GLINES (W. A.). **Intestinal Parasites as Cause of Appendicitis.**—*Bol. Assoc. Med. de Puerto Rico.* 1916. Dec. Vol. 13. No. 113. pp. 249–251.

The author cites three cases which came under operative treatment for appendicitis. Two were associated with amoebae. In the third the appendix was elongated to about four inches, greatly congested and contained a small live *Ascaris lumbricoides* completely blocking the lumen. The patient, a strong healthy boy, was one evening suddenly attacked with pain in the right iliac fossa. There was vomiting and a temperature of 38·5° C. There was no previous history of pain in the appendical region.

R. T. L.

RAFAEL RISQUEZ (Jesús). **Nota acerca de la parasitologia apendicular.** [Note on the Parasitology of the Appendix.]—*Gaceta Med. de Caracas.* 1917. May 15. Vol. 24. No. 9. pp. 71–72.

A note on the parasites and their eggs found in the appendices of

28 Venezuelan subjects. In 22 of the cases, the appendices were personally removed by the author at autopsies, and in the remaining 6, the specimens were sent by surgeons who had removed them by operation.

In the first 22, presumably normal, there were found:—

Eggs of *Trichocephalus trichiurus* ..	19	times.
„ „ *Ascaris lumbricoides*	4	„
„ „ *Uncinaria* [*Necator*] *americana*	2	„
„ „ *Schistosoma mansoni*	2	„
Adult *Trichocephalus trichiurus*	3	„
Negative	2	„

and in the remaining six—

Eggs of *T. trichiurus*	4	times.
„ „ *U.* [*N.*] *americana*	3	„
„ „ *S. mansoni*	2	„
„ „ *A. lumbricoides*	1	time.
Larvae of *U. americana*	1	„
Negative	1	„

J. B. Nias.

FUJINAMI (A.). **[Immunity to Macroparasitic Diseases. Can it be acquired?]** *Kyoto Igaku Zassi.* 1916. July 20. Vol. 22. No. 3. pp. 176–185. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. p. 81.]

In his studies of schistosomiasis in endemic regions several facts were noted which led the author to doubt if repeated infections were frequent even under exposure. Children were much more affected than adults but those of any age who came into the endemic districts for the first time were usually taken sick after their first work in the rice-fields. Calves from outside soon sickened and many died; those that recovered seemed to be more resistant in later years.

A horse which had two years previously been infected and had recovered, along with two other horses that had never had the disease, was exposed to identical conditions of infection, i.e., were compelled to stand with their legs in canal water known to be heavily infected with cercariae. One of the two latter horses was kept there longer than the others. In two months this horse died and more than 20,000 worms were recovered from the portal system. About a month later the other two animals were killed. In the horse exposed for the first time about 10,000 parasites were found while in the animal which had been previously infected and had recovered not a single worm was found after careful examination. The livers of the susceptible horses both showed microscopically numerous areas of granulation tissue produced by the deposition of the eggs. In the immune horse the liver showed healed lesions and scattered clumps of degenerated eggs in almost obliterated foci. A second infection six months after the first succeeded in a rat, the worms from the first invasion being still alive.

R. T. L.

LANE (Clayton). **Are** ***Echinostomum malayanum*** **and** ***Artyfechinostomum sufrartyfex*** **identical ?**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 440–441.

A decided objection to the view that these two recently described parasites of man are identical is that the cirrus sac in the latter reaches a point 0·75 mm. caudad of the caudad edge of the ventral sucker while ODHNER'S first characteristic of the sub-family Echinostominae is that the cirrus sac usually reaches to the centre of the ventral sucker but never reaches caudad of this. The author considers that in future it would be wise to avoid the attempt to obtain both the alliteration so useful in indicating a type species and the complimentary inclusion of the name of a donor as attempted in "*Artyfechinostomum sufrartyfex*" unless the result can be reached "by a less cacophonous combination of syllables than was the case in this effort." [Further the International Rules of Nomenclature recommend under Art. 8 that "the use of proper names in the formation of compound generic names is objectionable."]

R. T. L.

CIUREA (J.). **Die Auffindung der Larven von** ***Opisthorchis felineus***, ***Pseudamphistomum danubiense*** **und** ***Metorchis albidus*** **und die morphologische Entwicklung dieser Larven zu den geschlechtsreifen Würmern.** [Discovery of the Larvae *of O. f.*, *P. d*, and *M. a.* and their Morphological Development to Mature Worms.]—*Zeitschr. f. Infektionskr. parasit. Krankheit. u. Hyg. d. Haustiere.* 1917. Feb. 14. Vol. 18. No. 3. pp. 301–333.

OSKANAZY had already shown experimentally in 1905 that *Opisthorchis felineus*, an occasional parasite in man, could be experimentally transmitted by feeding with uncooked fish of the family Cyprinidae, but the larval forms regarded by him as those of Opisthorchis are considered by the author to belong to the Holostomidae.

The cysts of *Opisthorchis felineus* which have been isolated from Roumanian fishes, *Tinca tinca* and *Idus idus*, by Ciurea measure 0·24–0·34 mm. by 0·18–0·24 mm. or without their capsule 0·2–0·26 mm. by 0·12–0·18 mm. The encysted worms can survive for several days after the death of the fish. The worms attain sexual maturity 12 days after the encysted stage has been fed to the definitive host (dog or cat) and are then about 3 mm. in length.

Pseudamphistomum danubiense and *Metorchis albidus* do not occur, so far as is known, in man. The former encysts chiefly in *Tinca tinca* and *Idus idus*, the latter in *Blicca björkna*.

R. T. L.

NAKAGAWA (K.). **[Contribution to the Life-History of** ***Paragonimus westermanii.*****]**—*Saikin Gaku Zassi.* 1916. Jan. 25. No. 243. pp. 189–200. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 65–67.]

Eggs of *Paragonimus westermanii* hatch in water in from 25 to 28 days. The miracidia attack *Melania libertina* and *M. obliquegranosa*. Later these exhibit cercariae similar to those found in snails under natural conditions. The stylet of these cercariae is similar to that of the encysted cercariae found in the crab *Potamon* (*Geothelphusa*) *obtusipes*. In the liver of the snails the miracidia become sporocysts and these give rise to cercariae. No redia has been noted. In the early stages in the crab the young forms measure 0·13 mm. in length by 0·05 mm. in breadth. The oral sucker measures 0·04 mm. in diameter and is armed with a stylet. The ventral sucker is 0·02 mm. A thin sac now encloses the worm which is completely bent upon itself. This sac has a diameter of 0·11 mm. and the pharynx and excretory organs become evident. The mature cyst measures 0·3 mm. to 0·4 mm. in diameter and its walls have a thickness of 0·09 mm. to 0·014 mm. By this time the worm is straight, short and fat; not bent upon itself. The oral sucker has a diameter of 0·07–0·09 mm. and the ventral sucker 0·09–0·11 mm. These encysted cercariae are said to pass to man on the eating of infected crab or possibly in some free form.

R. T. L.

MORIYASU (R.), ARIMA (E.) & TANAKA (J.). [**Note on Presence of** *Paragonimus westermanii* **in Korea.**]—*Tokyo Med. News.* 1915. Oct. 2. No. 1914. p. 201. [Abstract based upon Review by R. G. Mills, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. p. 73.]

In Kang Wha, a large island in the mouth of the Han River, near Chemulpo as many as 31 per cent. of the crabs collected sometimes contained the cysts of *P. westermanii.* The people here relish the flesh of the crab after it has been soaked in "soy" for several days. This "soy" is essentially a strong solution of salt and contains more or less pepper. From the crabs dogs were experimentally infected by feeding.

R. T. L.

ANTO (R.) & YAMATA (R.). [**X Ray Diagnosis of Pulmonary Lesions of** *Paragonimus westermanii.*]—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1916. Nov. 28. No. 169. pp. 934–935. [From Review by R. G. MILLS.]

Lesions in dogs and white rats could be definitely distinguished on the photographic plate and the correctness was confirmed by autopsy. The findings in man were not so plain but resembled the picture given in Tubercle. Detection of light infection was more difficult but of severe involvement was relatively simple.

R. T. L.

ANDO (R.). **Suggestions as to Prophylaxis of** *Paragonimus westermanii*—*Medical News, Domestic & Foreign.* 1915. Nov. 20. No. 856. pp. 202–203. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 73–74.]

Limewater (1 per cent.) killed six out of ten specimens of the snail intermediary in seven hours. Copper sulphate (1 per cent.) killed in six hours. This was found to be the most active lethal agent against the crabs. The encysted worms are very resistant. They were found alive in the bodies of crabs two days after these had died from natural causes. Sunlight, heat and boiling water killed them when separated from the host. Drying, by sunlight or artificial heat, is fatal in a few minutes. Within the tissues they are much more resistant especially those from the cheeks. To kill the parasites the crabs must be heated in water to a temperature of 75° C. or roasted until their legs are charred. The worms remain alive in alcohol for 13 hours, in sweet "sake" for 17 hours, and in "soy." In 10 per cent. salt solution they survive 48 hours and in a mixture of "soy" and vinegar for 22 hours. In the native pickle they retain their vitality for 24 hours. As prophylactic measures people should not eat crab especially raw or partially cooked; those species most commonly infested should be avoided. The water of rivers in infected districts should not be used for drinking or for the washing of food or table utensils.

R. T. L.

SIERRA LEONE. **Report on Prevalence of Bilharziasis amongst the Pupils of the School for Sons of Chiefs, Bo.**—Report received in Colonial Office 8th May 1917.

In November and December 1915, Dr. G. G. BUTLER examined 75 scholars of the Bo School for the sons of Chiefs, Sierra Leone. In the urine of 20, Bilharzia eggs were found [see this *Bulletin*, Vol. 8, p. 511]. In 1917 the enquiry was pursued by Dr. E. WARD. He examined 107 boys and found 14 to be infected; 16 reported by Dr. BUTLER as showing infection appeared now to be clear. Of the 14 Konnoh boys examined 5 were infected, of the 52 Mendi, 8. Ward believes that Bo is not an endemic area and that the infection brought by the boys does not long persist. In six of the cases there were no symptoms at all. It appears that it is proposed to move the school to the Kennema District, which Ward is inclined to think is not infected, though "some cases may and probably do occur." The water supply of the proposed site is not liable to contamination between its source and the site. Molluscs found in the Kennema streams were sent to the Colonial Office and were forwarded to the London School of Tropical Medicine.

Dr. R. T. LEIPER reports that these belong to the species *Ampullaria balanoidea*, which is not a known carrier of Bilharzia. He considers that opinions for or against a state of Bilharzia infection in any area are valueless in default of microscopical examinations. If the carriers of Bilharzia occur in the Kennema waters, as BUTLER thought probable, "the stream supplying the school may become a growing menace to the inmates unless steps are taken to prevent its contamination by boys of the school who may take the infection there." He points out that infection may occur by the mouth as well as through the skin, and suggests that the stream supplying the water should be placed permanently out of bounds. Infected water (when freed from molluscs) becomes safe if allowed to stand for 48 hours. For purposes of ablution it can be rendered so immediately by the addition of crude cresol (1–10,000) or by chlorination (three parts per million).

A. G. B.

BECKER (J. G.). **A Further Note on Bilharziosis in the Transvaal.**—*Med. Jl. of S. Africa.* 1916. Oct. Vol. 12. No. 3. p. 42. With 2 figs.

In a short note the author states that three adult male worms of *Schistosoma haematobium* were found in the portal vein of a guinea-pig which had been subcutaneously injected six months previously (7th April, 1916) with 1 c.c. of water containing cercariae, identical with those described by LEIPER in Egypt, which had been discharged from *Physopsis africana.*

R. T. L.

CAWSTON (F. G.). **The Cercariae of Natal.**—*Jl. Parasit.* 1917. Mar. Vol. 3. No. 3. pp. 131–135.

From April to July, 1916, the author examined 1,500 molluscs from the rivers and fresh-water pools of Natal. These comprised the species *Limnaea natalensis, Planorbis pfeifferi, Planorbis leucocheilus, Physopsis africana, Isidora tropica* and *Isidora forskali.* At one place large numbers of *Ancylus* (*ferrissia*) *burnupi* occurred.

Cercariae of various kinds were found in 211 specimens. The molluscs from a brickfield at Durban and a pool of the Umsindusi at Pietermaritzburg most commonly gave infected specimens. All the cercariae were distomes, " none had spines or stylets and there were no projections from the body or tail. A pharynx was noted in only one form and eyespots were present only in cercariae from one specimen."

From the Toll Gate brickfield at Durban *Planorbis pfeifferi, Limnaea natalensis* and *Physopsis africana* were obtained containing, in about 30 per cent. or less, a large cercaria here named *C. catenata* which developed in rediae giving the liver an orange colour. In *Physopsis africana* from the Umsindusi 16 sporocysts containing leptocercous distomes were found. Similar sporocysts were present in two *Limnaea natalensis* from the same source.

No cercariae were found in over 50 specimens of Isidora from infected places.

Furcocercous cercariae were found only in *Physopsis africana* occasionally in association with " tadpole " forms.

Ninety-nine specimens of *P. africana* harboured Bilharzia cercariae. One specimen from the Durban brickfields harboured a sporocyst containing an eye-spotted form of furcocercous cercaria which the author names *Cercaria oculata* " in consideration of its resemblance to the Egyptian form."

In the Umsindusi Pool 70 specimens of *P. africana* were found to harbour a common furcocercous cercaria named by the author *Cercaria secobiana.* This form is stated to be narrower and slightly smaller than the eye-spotted form and to be limited in distribution to the Umsindusi River.

In the brickfields at Durban 23 specimens of *P. africana* (i.e., 15 per cent.) were found to harbour cercariae which answered to the description of the Schistosome Group. The proportion was lower in the same mollusc from the Umsindusi River.

The author added some water containing miracidia obtained from the urine of a patient suffering from bilharziasis, to a vessel containing specimens of *P. africana* from the Umsindusi River.

"At the end of a fortnight in one specimen a small sporocyst was seen throwing out branches throughout the liver substance giving it a yellowish-white appearance. In another specimen a similar young sporocyst occurred with undeveloped cercariae with bifid tails. After three weeks 14 out of 31 (i.e., 45 per cent.) harboured Bilharzia cercariae while only 15 per cent. of specimens obtained direct from the River were found to be infected at that period of the year. In another series of experiments the addition of Bilharzia miracidia apparently increased the number of infected forms from 22 per cent. to 37 per cent. and from 22 per cent. to 27 per cent.

"Similar experiments with specimens of *Planorbis pfeifferi* and *Limnaea natalensis* proved entirely negative."

[The generic names Isidora and Bullinus are synonymous. Pyrgophysa and Physopsis are both sub-genera of Bullinus or Isidora and contain respectively the species *I. forskali* and *P. africana.*]

R. T. L.

CAWSTON (F. G.). **Bilharzia Prophylaxis.**—*S. African Med. Rec.* 1917. Feb. 10. Vol. 15. No. 3. pp. 38–39.

The author is of opinion that "with so many troops returning from East Africa infected with the disease, it is most important that steps should be taken to remove the susceptible snails from all dams, rivers and pools which are used for bathing purposes" in South Africa.

An interesting summary is given of the previous finds of trematode cercariae in South African molluscs. In 1910 Dr. J. D. F. GILCHRIST reported two cercariae from *Physa tropica* [*Bullinus tropicus*]. One of these had a bifid tail. In the following year Dr. GILCHRIST met with two cercariae in specimens of *Physopsis africana* at Pietermaritzburg. One had a spine in the oral sucker; the other a bifid tail. At that time the possibility that one of these cercariae was a stage of the bilharzia parasite of man was considered but it was not until June of 1915 that Dr. WARREN noted their similarity to those described in the January issue of the *British Medical Journal.* One of the South African bifid-tailed cercariae has recently been shown [BECKER; see above] experimentally to be a schistosome larva.

R. T. L.

SMITH (P. E. Walton). **Bilharziosis.**—*Med. Jl. Australia.* 1917. Jan. 27. Vol. 1. 4th Year. No. 4. pp. 79–80.

Three returned soldiers were admitted to No. 4 Australian General Hospital in November 1916 suffering from bilharzia infection. All had become infected through swimming in the fresh water canal at Tel-el-Kebir, Egypt. It is stated that several of the other bathers also developed bilharziasis. They all noticed that the skin itched and tingled for about a quarter of an hour after leaving the water. In each case urticaria was a prominent feature; all showed a high degree of eosinophilia. Bilharzia ova were found in two of the patients in the peripheral blood! In one of the cases the ova were lateral spined

[*S. mansoni*] and these occurred in the faeces only. This patient arrived in Egypt on March 12th and was admitted to Hospital on 14th August, 1916. The symptoms then were "pain in the upper part of the abdomen and back, loss of appetite, headache, shivering and sweating"; ten days after admission urticaria developed on both lower limbs. The liver and spleen were enlarged. The leucocytes totalled 18,000, of which 60 per cent. were eosinophile. The author states that the patient still complains of pain over the descending colon and of occasional attacks of diarrhoea. The motion contains blood and mucus but ova are no longer found. The eosinophilia is however 46·5 per cent.

The other two cases appear to have been due to eggs of the terminal spined variety. Eggs were found in the urine in the one case; in the faeces in the other. There was a similar history of urticaria and diarrhoea with a high degree of eosinophilia.

R. T. L.

POULTON (B.) & RICE (P. W.). [**Demonstration of Two Cases of Urinary Bilharziasis.**]—*Med. Jl. Australia.* 1917. Jan. 27. Vol. 1. 4th Year. No. 4. pp. 90–91.

The authors record the occurrence of symptoms of urinary bilharziasis in two Australian soldiers invalided from Egypt to Australia in 1916. The first case had been in Egypt eight months. No details are given of the second case. The memorandum issued from General Headquarters of the Mediterranean Expeditionary Force in February of the same year is quoted in full. In an editorial article on this and the preceding paper the risk attending the introduction of bilharzial infections into Australia is commented upon and it is hoped that every health department "will set in action the machinery necessary for the control of the infection" there.

R. T. L.

NARABAYASHI (H.). [**Contribution to the Life-History of** *Schistosomum japonicum*.]—*Kyoto Igaku Zassi.* 1916. July 20. Vol. 22. No. 3. pp. 1–63. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 80–81.]

Lime is the best and most economical of the chemical agents that have been suggested for the extermination of the intermediate host, for which, according to PILSBRY, *Blanfordia nosophora* is the correct name. The cercariae are photophobic, are quickly killed by higher temperatures than 50° C., by drying, by 10 per cent. salt solution and by artificial gastric juice. One in 1,000 of lime kills in 30 minutes and is recommended as practical because of its value as a fertiliser. Bismarck brown and neutral red are good vital stains. The cercariae show no special reactions to normal serum or to schistosome immune serum. Man, cattle, horses, goats, pigs, cats, dogs, etc., are spontaneously invaded by the worm in nature. Experimentally monkeys, guinea-pigs, rats, mice, etc., may be infected with ease. The portal system is the place of selection but, especially in high infections, heterotropic parasitism is not infrequent. The worms have been known to live, in the horse, for 270 days. The schistosome contains ferments that digest albumen in an alkaline medium.

Mere dampness is adequate for the invasion of the skin. Infection succeeded if the water was kept above 20° C. A coating of oil on the skin proved impervious. In man the worms can penetrate the healthy skin through the hair or root sheath. There is usually only a small red spot but sometimes a papule or vesicle. At the site a slight round cell infiltration in the epidermis, oedema of the subcutaneous tissue, and even dilatation of adjacent vessels and minute haemorrhages occur with slight infiltration of round cells, polymorphs and eosinophiles around the vessels.

Penetration of the skin causes an itching sensation caused partly mechanically but chiefly by some irritating substance not easily separated from the worm. A definite relation exists between schistosomiasis and a skin disease called "Kabure." The author induced the latter experimentally on himself. After penetration of the skin a few of the parasites enter the arteries but most take thé venous route. These latter reach the right heart and meeting some few from the lymph channels are scattered all over the lungs. They here leave the circulation and collect at the base of the lung and then migrate through the mediastinum, diaphragm and liver until the portal system is reached. Exceptionally a few get back into the circulation and ultimately reach the rectum and adjacent tissues. This method of body invasion has been experimentally traced in dog and guinea-pig and presumably is that followed in man.

R. T. L.

SUEYASU (Y.). **[Complement Fixation in Horses affected with Schistosomiasis.]**—*Kyoto Igaku Zassi.* 1916. July 20. Vol. 22. No. 3. pp. 188–190. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. p. 81.]

The blood of the horses used by NARABAYASHI and FUJINAMI in their experimental studies on schistosomiasis was examined and a positive test observed in the immune animal and a negative one in the non-immune animal: both aqueous and alcoholic extracts of the worms were used as antigen.

R. T. L.

i. ITURBE (Juan). **El huésped intermediario del** ***Schistosomum mansoni*** **en Venezuela.**—*Gaceta Med. de Caracas.* 1917. Apr. 15. Vol. 24. No. 7. pp. 51–52. With 2 plates.

ii. ITURBE (Juan) & GONZÁLEZ (Eudoro). **The Intermediate Host of** ***Schistosomum mansoni*** **in Venezuela.**—7 pp. With 2 plates. Laboratory of Dr. Juan Iturbe. Special Edition ordered by the National Academy of Medicine.

The molluscs commonly found around Caracas are *Ampullaria luteosoma, Physa rivalis, Planorbis cultratus* and *Planorbis guadelupensis.* These were submitted to infection with miracidia and except *P. rivalis* all proved susceptible. *Planorbis guadelupensis* alone was easy to infect and in it the authors observed the entire evolution of the parasite, nearly all the snails exposed to infection showed typical cercariae by the end of the sixth week. The various stages are figured. Infection was obtained experimentally in white mice after exposure for two or three hours in water containing snails which had been infected 45 days previously. The most constant successes followed feeding the experimental animals with food which had been contaminated with livers of *P. guadelupensis* containing large numbers of cercariae. The authors consider *P. guadelupensis* as the true intermediary of *S. mansoni* in Caracas. These snails are found already infected in an alarming proportion in several quarters of the city: in Creek No. 1, R. del Valle, 120 specimens out of 400 were naturally infected. The authors describe and figure a redia in the developmental cycle and state that their observations corroborate the evolutionary stages described by MIYAIRI and SUZUKI for *S. japonicum.*

R. T. L.

LEGER (Marcel). *Schistosomum mansoni* **Sambon à la Guyane Française.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 464–467.

The occurrence of *Sch. mansoni* in French Guiana has been noted previously by Drs. A. HENRY and THÉZÉ but the cases appear to have acquired their infection in the West Indian Islands. Over a period of eight months the author has examined faeces from 801 persons in French Guiana. Fourteen cases gave lateral spined eggs. In one case the infected person had been born in and had never left the country. He had always lived on the coast. In the other cases there was a history of having come from Guadeloupe, Martinique, Algeria or Tunis from four to 29 years previously.

R. T. L.

RAFAEL RISQUEZ (Jésus). **Nota sobre la invasión de los ganglios linfáticos por los huevos del** *Schistosoma mansoni.*—*Gaceta Med. de Caracas.* 1916. Sept. 15. Vol. 23. No. 17. pp. 135–136.

This is a preliminary note based on an examination of the lymphatic glands from the mesenteric tissues of four cases examined in Caracas. All the glands were increased in volume and some measured more than a centimetre in diameter. The colour is pale rose and deeper than that of the others. The tissues were well preserved in Bouin's fluid. The capsule of the gland is enlarged in most cases. In the interior of the gland are agglomerations of round cells with smaller round nucleus, well stained, and of lesser diameter than a leucocyte. There are others of the same form larger and with single or multiple nucleus. Among these cellular agglomerations are clear spaces in which can be seen large stellate cells of conjunctive type. Ova of *Sch. mansoni* have been encountered in the masses of the tissue proper of the gland or within the originating branches of the afferent or efferent vessels. Up to the present time the author has not been able to verify the invasion of the glands of the intestinal mesenteries, nor has he seen ova in the glands of the gastro-hepatic epiploön although these are infarcted.

R. T. L.

ROMERO SIERRA (J. M.). **Sobre un caso de hepato-esplenomegalia de origen bilharziano (?).** [On a Presumed Case of Hepato-Splenomegaly of Bilharzial Origin.]—*Gaceta Med. de Caracas.* 1917. Apr. 30. Vol. 24. No. 8. pp. 61–69. With 4 text figs. & 1 chart.

Notes of a fatal case of enlargement of the liver and spleen with fever, which the author thinks from the clinical symptoms may be ranked as one of the type described by RAFAEL RISQUEZ as due to infection of the portal system with bilharziasis. Unfortunately, as an autopsy could not be obtained, the diagnosis remains somewhat in doubt.

The patient, a boy 18 years of age, was a native of Caracas. When 12 years old the patient had had symptoms of dysentery for some months, and had been treated with ipecacuanha. Two years previously he had a hard chancre. The illness under notice began in December 1915, and terminated fatally on the 19th January 1917. The symptoms began with epistaxis, thirst and polyuria, accompanied by diurnal fever of a remittent type, with occasional rigors and sweats. Anti-malarial treatment was instituted in the first instance, without benefit, and was consequently abandoned. The liver and spleen were found to be notably enlarged, and extended nearly to the umbilicus. Ova of *S. mansoni* and *T. dispar* were found in the stools, along with encysted amoebae. Doses of santonin and extract of male-fern were consequently given. Exploratory punctures were also made into the liver, in search of a liver abscess, with a negative result. A variety of medical treatments followed, which is described in great detail, including a mercurial course for syphilis, but none were attended with any benefit. The patient eventually died from ascites and exhaustion. The blood was duly examined during the course of the illness for malarial parasites, and also for Leishman bodies, but always with a negative result. There was a somewhat pronounced leucocytosis with slight eosinophilia, and the number of red cells fell during the course of the illness to 3,000,000 per cubic millimetre.

J. B. N.

PARREIRAS (Decio). **De um caso de ascaridiose, com localisaçoes hepaticas.** [A Case of Ascaridiasis with Hepatic Complication.] *Arch. Brasileiros de Med.* 1916. Sept. Vol. 6. No. 9. pp. 530-536. With 1 plate.

Death, apparently due to invasion of the liver and blocking of the pancreatic and common bile ducts by *Ascaris lumbricoides*, occurred in a woman, aged 68, who died four days after entering hospital at Nictheroy. On admission the temperature was 39° and the pulse beats were 106 per minute: the symptoms resembled those of intoxication. On the following day the pulse became weaker and the lungs exhibited signs of congestion. There was also pain in the epigastrium with frequent diarrhoea. The liver and spleen were enlarged. The soporose condition of the patient continued, and on the third day the patient vomited a quantity of round worms, the fever continuing. On the last day of the illness jaundice appeared with much tenderness of the liver, the pulse became thready, and the patient died in a state of collapse. Post mortem the stomach was found to be greatly dilated and contained 20 living roundworms. The intestines showed some catarrh, and contained about 200 roundworms. The pancreatic duct was plugged by worms. The liver extended well beyond the costal margin, and the capsule of Glisson was thickened. The gall-bladder was much distended, and the gall-duct plugged by a large round worm, which was alive when extracted. On the inferior surface of the liver there was general perihepatitis in the form of nodules, which resembled in appearance a cancerous new growth. The liver substance when incised showed similar nodules, of a whitish colour, but not so hard, and these were found to contain living and active roundworms. The parenchyma of the liver was spongy, and showed on microscopical section irregular cavities containing a number of ascarides and their eggs, of which some were free while others adhered to the cyst walls. The substance of the liver showed infiltration with lymphocytes, large mononuclear cells, eosinophiles, and droplets of fat, and the kidneys were granular.

J. B. N.

PERRET (J. Maxime) & SIMON (H. Theodore). **Intestinal Obstruction due to *Ascaris lumbricoides*. Report of a Case.**—*Jl. Amer. Med. Assoc.* 1917. Jan. 27. Vol. 68. No. 4. pp. 244–245. With 1 text fig.

Although rare, a few cases of intestinal obstruction have been due to roundworm. The author summarises the histories of 11 cases recorded since 1887. Most cases are diagnosed at necropsy or during operation and it is seldom that the mass of worms is expelled naturally. Although the most drastic purgatives may be unavailing, an enema may succeed in relieving the condition. Clinical details are given of an additional case in a white girl aged 8 admitted for acute intestinal obstruction. "Five days prior to admission the child was suddenly taken ill with a pain in the right lower abdominal quadrant and slight elevation of temperature. On the second day she began to vomit. This continued up to her admission to hospital. The vomitus consisted of a clear watery fluid. Only a very small stool passed after castor oil. On examination the abdomen was found 'distended and tympanitic; there was no rigidity. In the left lower abdomen, in the region of the sigmoid, a mass the size of a large lemon was palpated. The viscera were not palpable.' A purgative enema was given after the examination was concluded and returned colored with faecal matter and contained a mass of approximately forty roundworms, coiled and interwoven, the size of a child's closed fist. After a second enema the distention was relieved and except for a rise of temperature during the succeeding eight hours the patient recovered uneventfully.

R. T. L.

SHIMAMURA (T.) & FUJII (H.). [**"Askaron" a Toxin extracted from *Ascaris lumbricoides*.**] — *Saikingaku Zassi.* 1916. June 10 & July 10. Nos. 249, 250. pp. 25–60, 9–50. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 69 & 76.]

The authors have sought to isolate the substance responsible for the toxic symptoms observable in clinic and laboratory as due to these worms. The phenomena resulting in horses from the application of body fluid of the ascaris to the eye as recounted by WEINBERG are thought to be due to some volatile substance, not to the so-called askaron. The toxin isolated by the authors is a mixture of albumoses and peptone and when injected under the skin or into a vein of a horse hyperaemia of all visible mucosae, increased passage of urine and faeces, dyspnoea, oedema, palpitation, spasms, colic, rapid pulse, urticaria and faintness followed but disappeared within two to three hours. With larger doses the colic and faintness increase and death results within four to six hours. Other reactions are given. The maximum tolerance after intravenous injections in a guinea-pig is only twice the lethal dose after one week and no resistance remains after one to two months.

Complement fixation tests on horses and pigs were negative. Immune horse serum and askaron gave a positive deviation. The precipitin test was negative with healthy horse serum but weekly positive with immunized serum. It seems likely that askaron is not a specific toxin produced for a definite purpose but is merely a metabolic product that happens to be toxic.

R. T. L.

NICOLL (William). **Observations on the Influence of Salt and other Agents in Modifying the Larval Development of the Hookworms:** *Ankylostoma duodenale* **and** *Necator americanus.*—*Parasitology.* 1917. Feb. Vol. 9. No. 2. pp. 155–189.

The chief source of the spread of hookworm infection is promiscuous distribution of excreta. There should be little or no risk in the presence of a properly organised sanitary system. The more commonly used disinfectants would render faecal material comparatively innocuous but their use is not less laborious than the proper removal of the faecal material and its disposal in properly constructed receptacles.

Common salt has an injurious effect but requires to be brought into very intimate contact; mere sprinkling is almost futile. Mixing with sand promotes the development of hookworm larvae but when the faecal matter is covered to a certain depth development is arrested. Eggs and larvae are killed very rapidly by direct sunlight. The following points are substantiated by a large series of experimental data:—It is shown that solutions of even 6 per cent. of salt cannot be relied on to destroy hookworm eggs in less than a week; they retard however the development of the eggs and larvae. Solid salt sprinkled on the faeces is absorbed extremely slowly and does not permeate the mass until more than 48 hours have elapsed. When solid salt is *thoroughly* mixed with faeces (1 part to 2) development is completely arrested within 48 hours and the eggs do not hatch; when the salt is reduced to one-third of the weight of faeces a few eggs may survive for two days and give rise to larvae, in three days the eggs are all killed; 17 per cent. of salt sprinkled on the surface is not sufficient to kill eggs within 24 hours and 8 per cent. did not suffice in less than four days. Admixture of faeces, fairly consistent and dry but not formed, with from half to twice the amount of sterilised sand gave active and vigorous larvae except when the sand completely covered the faeces. Eggs resist exposure to direct and strong sunlight alone or in water for over two hours; under glass all are killed within an hour.

R. T. L.

MHASKAR (K. S.). **The Prevalence of Ankylostomiasis in the Madras Presidency. Report of an Inquiry carried out at the Negapatam Emigration Depôt.**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 771–785.

Investigations at Negapatam, a seaport in the Tanjore district of the Madras Presidency and an important centre of emigration to the Straits Settlements, showed that of 4,728 emigrants examined, 4,664, i.e., 98·6 per cent., had ankylostome infection. A similar rate of incidence is noted for two typical villages in the Tanjore district. Infection occurs irrespective of caste, age, sex, occupation and social status. The physical condition of coolies, who are more or less selected, demonstrates that hookworm infection is not incompatible with apparent good health. Among the school children of Negapatam and two neighbouring villages deterioration of physique, anaemia and much ill-health is attributable to hookworms. It is stated that hookworm infestation is universally prevalent in the rural areas of Trichinopoly, Tanjore, Malabar, Madura, and South Arcot districts and of the Puddukottah State

The eosinophile index in 84 per cent. of 500 school children ranged from 6 per cent. to 15 per cent. but this is complicated to an undetermined degree by universal infections with Ascaris and Trichuris. The haemoglobin showed an average of 71·3 per cent. This low index is chiefly attributable to hookworm as malaria, tuberculosis and other constitutional causes are not sufficiently common to account for the uniform anaemia.

R. T. L.

LANE (Clayton). **The Hookworm and the War Loan.**—*Indian Med. Gaz.* 1917. May. Vol. 52. No. 5. pp. 161–164.

The population of British India is over 315 millions. A conservative estimate gives 45 million wage-earners infected with hookworms. Assuming that the average yearly wage of these is one hundred Rupees, these men are now earning four hundred and fifty million Rupees annually. Employers of labour in the district of Darjeeling in which a hookworm campaign has recently been carried out by the author estimate that the freeing of their labourers from hookworm increased their earning capacity by from 25 per cent. to 50 per cent. Taking an actual improvement over the whole of India as 10 per cent. only, the earnings would rise by thirty millions sterling per annum. This would cover the whole of the Indian War Loan in but little over three years. Taking a more generous estimated improvement of 33 per cent., "the amount of the Indian War Loan represents the increased earnings which could be made in one year by the people of this country, could they all be immediately freed from hookworm infection."

R. T. L.

LANE (Clayton). ***Bunostomum Kashinathi* and the *Ancylostomidae*.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 414–439. With 4 plates.

The finding of a new parasite in the sheep in India justifies the formation of a new genus, *Bustomum*, for *Bunostomum phlebotomum*, the genus *Bunostomum* being restricted now to *B. trigonocephalum* and *B. kashinathii* n sp. This change brings this sub-group into line with another sub-group containing Necator and Uncinaria. The author is thus led to revise the classification of the Ankylostome worms and their related forms thus:—The super-family Strongyloidea contains two families Strongylidae (sens. nov. et str.) and Ancylostomidae (sens. nov.). The Ancylostomidae comprises the sub-families (a) Ancylostominae (sens. nov. et strict.) with the genus Ancylostoma and two sub-genera Ancylostoma and Ceylancylostoma, (b) Nectorinae (subfam. nov.) in which are made two new tribes the Necatoreae or Necatoridi and the Bustomeae or Bustomidi. The former tribe should contain the genera: *Uncinaria*, *Grammocephalus*, *Bathmostomum*, *Gaigeria*, *Brachyclonus*, *Monodontus* and *Necator*. The latter tribe the genera: *Bunostomum*, and *Bustomum* (n.g.). [Necator and Bunostomum are genera in *Bunostominae* Looss 1911, which would appear to be the equivalent in nomenclature to Necatorinae. Uncinaria is here transferred from Ancylostominae to Necatorinae (i.e., Bunostominae).]

R. T. L.

CHOW (W. S.). **Hookworm Investigation in the Antimony Mines, Sinhwa, Hunan Province, China.**—*New Orleans Med. & Surg. Jl.* 1917. Apr. Vol. 69. No. 10. pp. 672–677.

A survey was made at " Hsi Kwang Shan," a valley about 20 miles south-east of Sinhwa. The altitude here is about 2,500 ft. above sea level. The soil is clayey and dry: the borings are shallow, none being deeper than one hundred feet. There is practically no water or dampness even at the greatest depths. There are no public sanitary conveniences or water supply. The waste matter is washed down and settles in pools and ditches so that permanent cesspools result.

An examination of coolies and miners showed that the infected persons were mostly those who had recently been farmers and these were undoubtedly infected in the rice-fields before entering the mines. Prophylactic measures in these antimony mines therefore must necessarily be directed to the farm fields, and labourers thereon, from which the supply of miners is drawn.

R. T. L.

OI (S.). **[*Necator americanus* and *Trichostrongylus orientale* present in Formosa.]**—*Taiwan Igakukai Zassi.* 1916. June 28. Nos. 163, 164. pp. 355–374. [Abstract based on Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. p. 75.]

In Japanese and natives of Formosa both *Necator americanus* and *Trichostrongylus orientale* occur, especially in the central portion of the island. Filaria is less common than in Japan, Korea and South Manchuria, and affects the rich idle class more than the labourers, who suffer more from the hookworm.

R. T. L.

i. STUCKEY (E. J.). **Circumocular Filariasis.**—*China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 24–25. With 1 plate.

ii. HOUGHTON (H. S.). **Note upon Filarial Parasites from the Conjunctival Sac.**—*Ibid.* pp. 25–26.

i. At the Eye Clinic of the Union Medical College Hospital, Peking, the author saw a Chinese yamen servant who stated that " since the preceding summer there seemed to be ' a worm ' or ' worms ' in his right eye " and produced a bottle containing a white thread-like object which he had removed from his eye two days before. After cocainization four white threadworms 8-13 mm. long were found in the fornices. On the following day the patient removed another worm from his right eye. The Rev. R. BIGGIN sent to the author specimens of a similar worm removed from the eyes of a pet dog at Tungchow. These and the specimens from the Chinese patient were sent to Dr. HOUGHTON for determination.

ii. The specimens found by Dr. STUCKEY and by the Rev. R. BIGGIN are considered by Dr. Houghton to be of the same species and are identified as *Filaria palpebralis* Wilson: a common eye worm of the horse. The worms from the dog are smaller than those from the human patient, the male measuring 6 mm., the female 10–12 mm., as compared with 9–10 mm. and 14–15 mm. In the males there are said to be four preanal papillae and a small postanal projection.

R. T. L.

TRIMBLE (C. G.). **Circumocular Filariasis.** [Correspondence.]—*China Med. Jl.* 1917. May. Vol. 31. No. 3. p. 266.

A further case of circumocular filariasis, similar to that recorded by Dr. STUCKEY, has been seen by the author in a Chinese farmer at the Fukien Hospital. A pain commenced in the right eye three months previously to his visit to the hospital; this became increasingly worse and there was an excessive flow of tears. For the last month the eye could not be closed completely. Examination showed severe ectropion of the right lower lid due to a more or less complete facial paralysis. There was only slight conjunctivitis. The tears flowed constantly down the face. In the superior fornix of the right eye two small active pink worms were found. These were both females but contained fertile ova. Immediate relief followed their removal. In the succeeding three weeks the epiphora disappeared and the muscle tone in the paralized area was restored to at least 50 per cent. of the normal.

R. T. L.

FUJII (S.) & HIKA. **[Filariasis and Elephantiasis in the Loochoo Islands.]**—*Jikwa Zassi.* 1916. Sept. 20. No. 196. pp. 15–24. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. pp. 172–173.]

Five boys and two girls among a juvenile population of 121 in the village of Dairi showed filaria embryos in the blood.

In the village Yosa there were nine carriers out of 97 children examined. (Of these seven were found in 53 boys and two among 44 girls.) In the village Takane only 16 out of 218 children gave a positive result. Seven districts had from 27·3 per cent. to 50 per cent. of the male populace infected with filarial embryos (general average 37·8 per cent.). The elephantiasis cases in the same districts ranged from 0·12 per cent. to 0·54 per cent. (general average of 0·27 per cent.). In five other districts the children gave an average of 13 per cent. infected with filarial embryos and 0·58 per cent. with elephantiasis.

R. T. L.

ROSENBUSCH (F.). **Beitrag zur Einteilung der Mikrofilarien in Argentinien.** [Distribution of Microfilaria in Argentine.]—*Cent. f. Bakt.* 1. Abt. Orig. 1916. May 9. Vol 78. No. 1. pp. 43–45. With 1 plate.

Filarial embryos have been observed in the blood of man in the Argentine Provinces of Tucuman, Salta and Jujuy. These embryos vary from 100 to 200μ in length with an average of 142μ long by 3μ broad. In the last two-fifths of the length the body narrows, and at 18 per cent. of the length from the posterior end it markedly tapers to a long pointed termination. No sheath is present. The nerve ring is 21·8 per cent. from the anterior end; the excretory pore at 30·28 per cent.; the genital cells at 67·1 per cent. and 74 per cent.; the anal pore at 77·7 per cent. and the last nucleus at 96 per cent. The observers noted neither periodicity nor clinical signs. The embryo is regarded as most nearly related to that of *F. demarquai.*

R. T. L.

BIRD (Jorge). **Filariasis en Puerto Rico.**—*Bol. Asoc. Med. de Puerto Rico.* 1916. Dec. Vol. 13. No. 113. pp. 239–245.

According to the author, *Filaria bancrofti* is extremely common in Porto Rico, both white and coloured races being equally attacked. Inguinal adenitis is the most usual clinical symptom, accompanied by rigors and fever, orchitis and difficulty in micturition. Many patients have such attacks regularly, about once a month, and the filaria embryos can then always be detected in the blood. Haematuria and chyluria are distinctly less common. The condition is generally called "erysipelas" by the patients. The frequency of filariasis in Porto Rico is ascribed to the neglect of sleeping under mosquito-curtains, which is particularly the case on the coast, where mosquitoes are most abundant.

J. B. N.

LYON (Marcus W.). **Filariasis. Report of Two Cases in the District of Columbia, and Analysis of the Cases reported for Eastern North America.**—*Jl. Amer. Med. Assoc.* 1917. Jan. 13. Vol. 68. No. 2. pp. 118–119.

These two cases were imported from West Indies and British Guiana. The author has analysed the records of all cases of filariasis reported for eastern North America. These total 142, of which 7 are doubtful, 104 were acquired in the United States, 28 in the West Indies or South America, 1 in Egypt and 2 unknown but probably in the United States.

The mosquito which serves as the intermediate host of *Filaria bancrofti* is *Culex quinquefasciatus* and ranges from as far north as Washington and St. Louis.

R. T. L.

YAMATA (S.). **[Contribution to the Life-History of** ***Bothriocephalus latus.*****]**—*Taiwan Igakukai Zassi.* 1916. Oct. 28. No. 168. p. 858. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 179.]

A strap-shaped worm found in the abdominal cavity of a woman, aged 47, was introduced into the stomach of a small dog; after 13 days some eggs were found in the faeces. These greatly increased in number in a few days and after two months the dog was killed. A large Bothriocephalus was found extending from the ileum to the rectum. The eggs were thin-shelled, slightly pointed and 0·0363 mm. by 0·0685 mm.

R. T. L.

LEON (N.). *Bothriocephalus taenioides.*—*Cent. f. Bakt.* I. Abt. Orig. 1916. Nov. 18. Vol. 78. No. 7. pp. 503–504. With 3 figs.

This worm, which has already been recorded by KUECHENMEISTER, GRASSI and FERRARA, LEUCKART and BLANCHARD, has at first sight the resemblance of a portion of Taenia but on further examination it is seen to be undoubtedly a misshapen *Bothriocephalus latus.* The author's specimen came from a woman in Jassy and consisted of four portions of a strobila of 67 segments measuring about 30 cm. in length. These are described and illustrated. The eggs are normal.

R. T. L.

AKASHI (S.). [*Davainea formosana* **nov. sp., a New Tape-Worm reported from Formosa and Tokyo.]** – *Taiwan Igakkai Zassi.* 1916. Sept. 28. No. 167. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. pp. 166–167.]

Specimens found in Formosa are similar to a "strange tape worm" from a child recently recorded in the *Tokyo Medical News.* The length of body is 43 cm. The head is globular, 0·4 mm. in diameter by 0·5 mm. in length. The rostellum is hemispherical, is concave on top and bears two rows of numerous hooks that are rose-thorn-like in shape. The suckers are round, unarmed, and measure 0·12 mm. in diameter. In the terminal fourth of the strobila the segments are considerably longer than broad, being 20–25 mm. by 1 mm. The last segments were shaped like a cement barrel. The egg masses were often irregular, sometimes polygonal in shape. The genital pore was unilateral and near the cephalic end of the segment. The eggs measured 0·099 by 0·046 mm.

R. T. L.

MATSUHARA (T.). **[Taenia Lingula (?) reported from a Subcutaneous Swelling in a Soldier.]**—*Higukwa Hitsunyokwa Zasshi* (*Japan. Zeitschr. f. Derm. u. Urol.*). 1916. Nov. 30. Vol. 16. No. 11. p. 51. [From Review by R. G. MILLS.]

A Japanese farmer, 48 years of age, returned from Manchuria after the Russo-Japanese war with a small swelling above the knee. In three years this migrated to the groin of the same side and a slight redness of the skin was noticed. This was opened to relieve the pain and evacuate the contents; several white worms were removed. The description of these is that they were translucent, blunt at one end, pointed at the other and measured 25 cm. in length by 0·2 cm. in breadth.

[Taenia lingula (?) in the title is probably intended for the tapeworm *Ligula mansoni* or *Sparganum mansoni.*]

R. T. L.

HOKI (R.). **[Report of the Finding of the Egg of** *Hymenolepis diminuta* **in Men.]**—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1917. Jan. 20. No. 2007. pp. 161–168. [From Review by R. G. MILLS.]

In faeces of soldiers from the Loochoo Islands the author identified an egg as that of *H. diminuta*: the morphology and measurements agree with a specimen obtained from a rat (*Mus decumanus*) and with the illustration in BRAUN'S Animal Parasites of Man. A drawing of the head is somewhat different and is reproduced on account of its possible taxonomic value.

The other species of parasites found were in the following percentages (85 soldiers):—

Hookworm (total)	84·3%
(*Necator americanus* only)	21·7%
Ascaris lumbricoides	74·7%
Trichuris trichiura	65·0%
Trichostrongylus orientalis	13·3%
Metagonimus yokogawai	1·08%
Taenia [*Hymenolepis*] *nana*	3·6%
Strongyloides stercoralis	12·0%
Oxyuris vermicularis	31·08%
(Unknown)	1·08%
Tapeworms or *Schistosoma japonicum*	—

R. T. L.

DUPONT (V.). **Spasme laryngé et** *Taenia.*—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 180–181.

The author describes in detail the history of a young native six years old brought to the Dakar Hospital in a serious condition of asphyxia. It was erroneously thought that the laryngeal spasm and almost fatal asphyxia lasting for several days was due to a foreign body but it seemed actually to be of reflex origin and due to the presence of a *Taenia saginata.* The symptoms disappeared with the removal of the worm after the administration of a vermifuge.

R. T. L.

Amaral (Alfranzio). **Ancylóstoma Eschistosóma.**—*Gaz. Med. Bahia.* 1915. Oct. Vol. 47. No. 4. pp. 175–180.

A philological article pointing out that Portuguese orthography does not tolerate the letter *k* except at the beginning of foreign words, so that Ankylostoma becomes Ancylóstoma, with the *c* pronounced hard [or *ch*, similarly pronounced, as given in some dictionaries]. Also Portuguese pronunciation requires the prefix of an *e* to *sch* which again is pronounced hard, like *sk*, so that Schistosóma becomes Eschistosoma.

J. B. N.

AMOEBIASIS AND DYSENTERY.

AMOEBIASIS.

WENYON (C. M.) & O'CONNOR (F. W.). **The Carriage of Cysts of *Entamoeba histolytica* and other Intestinal Protozoa and Eggs of Parasitic Worms by House-Flies with some Notes on the Resistance of Cysts to Disinfectants and other Agents.**—*Jl. Roy. Army Med. Corps.* 1917. May. Vol. 28. No. 5. pp. 522–527.

The authors made series of experiments in Egypt with the following genera of flies, Musca, Fannia, Calliphora and Lucilia. They found that all these were capable of ingesting cysts of *Entamoeba coli*, *Entamoeba histolytica* and *Lamblia intestinalis*. The subsequent history of the cysts after ingestion was traced, and it was found that the cysts disappeared from the intestine of the fly with the faeces which had been ingested. Twenty-four hours after the last feed on faeces the cysts were found in the intestine, but generally not after this period. *E. coli* cysts however were found in the fly intestine as late as 42 hours after the last feed on infected material.

The authors observed that Trichomonas in the active living state could pass through the intestine of the fly, and they conclude from this, and from the appearance and staining reactions of the cysts experimented with, that such cysts retain their vitality at the time they are deposited in the faeces of the fly.

Retention of cysts in the intestine of the fly for 16 hours after feeding on faeces, and their deposition by the fly while subsequently feeding on sugar and water were proved experimentally. The danger of flies acting as carriers is emphasized in view of this observation. Wenyon and O'Connor disprove the assumption of KUENEN and SWELLENGREBEL [see this *Bulletin*, Vol. 3, p. 76] that flies are unable to play an important part in the dissemination of cysts of *Entamoeba histolytica*. In their study on the resistance of cysts to various agents the test of vitality adopted was the eosin test. Cysts killed by heat stain immediately when dilute eosin is added to the material containing them. Similarly, strong sublimate solutions produce the same staining capacity, and the authors consider that the test is a valuable one.

An account follows of the experiments done. The cysts of *E. histolytica* resist drying very little, and the tropical sun is sufficient; the conclusion being that wind carriage in the tropics does not probably constitute a serious danger, except in so far as undried particles may be carried in this manner. Cresol proved the best of several chemicals used, and should be effective as a disinfectant for cysts in a strength of 1–40 or 50. The following is the summary of the experimental results with this reagent:—

> "(B.) Cresol. This reagent killed all cysts immediately in a strength of 1 in 20 (equal parts of 1 in 10 cresol and faeces emulsion), in one minute in a strength of 1 in 30, in half-an-hour in a strength of 1 in 100, in one hour in a strength of 1 in 200, and not at all in a dilution of 1 in 2,000."

In conclusion the authors advocate strongly the use of fly-proof latrines and covered receptacles.

B. Blacklock.

FINDLAY (G. Marshall). **Amoebic Dysentery and its Relationship to a Form of Diarrhoea occurring in Egypt.**—*Lancet.* 1917. May 19. pp. 755–756.

Microscopical examination in 110 cases of "Egyptian Stomach" (diarrhoea with gastric symptoms) occurring among naval ratings in Egypt gave the following results:—

Entamoebae entirely absent	8 cases
Entamoeba coli present	10 „
Entamoeba histolytica	36 „
Entamoeba minuta (Elmassian)	49 „
Entamoeba minuta (Elmassian) together with *tetragena* cysts	7 „

One sailor of 18 years of age developed a typical attack of amoebic dysentery two days after arrival in Egypt. The patient stated he had never been abroad before but two years previously had had an attack of dysenteric-like symptoms. This attack appeared to be associated with the return of his father, a soldier, from India. The author considers this to have been "an autochthonous case occurring in England."

B. B.

CRAIG (Charles F.) **The Occurrence of Endamebic Dysentery in the Troops serving in the El Paso District from July, 1916, to December, 1916.**—*Milit. Surgeon.* 1917. Mar. & Apr. Vol. 40. Nos. 3 & 4. pp. 286–302 & 423–434.

The troops serving in the El Paso district [Texas] and with the Punitive Expedition in Mexico suffered from a small epidemic of amoebic dysentery. The infections were clinically milder than those observed in the Philippines, but this the author believes to be due to early recognition of the cases and prompt treatment. The number of cases was 156, and three deaths resulted from the disease or its complications. The greater part of the first section of the paper deals with the analysis of the replies given by the patients to a series of questions which each was asked, having a bearing on the history of the individual.

Tables are given showing (1) the Organisations in which Cases of Endamoebic Dysentery occurred and number of cases in each; (2) Previous residence of soldiers suffering from Endamoebic Dysentery; (3) Camps in which Endamoebic Dysentery occurred and number of infections; (4) Period elapsing after arrival before symptoms of Endamoebic Dysentery appeared; also a chart showing incidence of the disease in weekly periods.

In the second section the carrier question is discussed. Of the total 156 cases, 21 had already developed cysts on admission to hospital, 7 of these being contact carriers; 65 of the remaining 135 cases developed cysts in spite of thorough treatment with emetine hydrochloride. After some calculations [there seems to be no evidence that "the 7 contact carriers" had been treated] the author concludes that of 115 cases who were sufficiently long and frequently examined 75 per cent. became cyst carriers. The author recommends discharge from service for those who continue to be carriers in spite of treatment.

B. B.

YORKE (Warrington), CARTER (Henry F), MACKINNON (Doris L.), MATTHEWS (J. R.) & SMITH (A. Malins). **Persons who have never been out of Great Britain as Carriers of *Entamoeba histolytica*.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 87–90.

Protozoological examination of the faeces of 206 healthy young men in training at a camp gave the following results :—

E. histolytica cysts	3·9 per cent.
E. coli cysts	10·7 „ „
Giardia intestinalis	4·3 „ „

A series of 138 cases in the Royal Infirmary, Liverpool, gave the following :—

E. histolytica cysts	1·4 per cent.
E. coli cysts	2·8 „ „
G. intestinalis	3·6 „ „
Tetramitus mesnili	1·4 „ „

The second series comprised male and female patients of various ages ; they were mostly surgical cases. None of the persons in the above two series had ever been out of Great Britain. A table is given showing the patients' age, residence, occupation and also in the case of the first series the date of going to the training camp.

Having established the fact that the cysts (*E. histolytica*) present in these cases were indistinguishable morphologically from those present in the faeces of convalescent dysenterics, the authors proceeded to test their pathogenicity. Four kittens were fed on faeces of four of the cases. On the sixth day after the infective feed amoebae were discovered in the faeces of one of the kittens. On the twelfth day the animal presented symptoms of acute dysentery and passed blood, mucus, epithelium and many amoebae. These symptoms persisted and the animal died on the twenty-third day. Post mortem small discrete ulcers were found scattered throughout the large intestine, and a large part of the mucosa appeared to be superficially necrosed ; enormous numbers of amoebae were found in scrapings. Sections of the gut are in course of preparation. Professor GLYNN carried out bacteriological examinations of the faeces of the patient from whom the material for feeding the kitten was derived, of the kitten during the period of acute dysentery, and of a scraping from the large intestine at the time of death. No bacilli of the dysenteric group were found. A second kitten died in six days but presented no symptoms nor signs of amoebic infection. The other two were alive and well at the time of writing on the eighteenth day. Reference is made to three records of acute amoebic dysentery originating in Great Britain [see this *Bulletin*, Vol. 8, p. 111, for the most recent of these]. The authors point out the great importance of the existence of carriers of amoebic dysentery among persons who have never been out of Great Britain ; they note that in the two groups of cases examined the incidence of *E. histolytica* cysts was three times greater among the recruits in camp than it was among the civilians in hospital. The recruits had been in the camp about two months and there were also present in the camp a number of men who had returned from the Mediterranean. [Attention may be drawn to SHIMURA's paper on a Non-pathogenic Form of *Entamoeba tetragena*. See below, p. 133.]

B. B.

VAGLIO (Ruggero). **Uno speciale reperto batterioscopico in due casi di dissenteria amebica.**—*Sperimentale.* 1917. May 28. Vol. 71. No. 1–2. pp. 47–52.

In two cases of amoebic dysentery the author noted the presence of fusiform bacilli together with spirochaetes in the faeces, and he calls attention to the part which this combination may play in certain cases, especially chronic, of amoebic dysentery, by aggravating the lesions or maintaining their effects.

B. B.

LEBOEUF (A.). **Le traitement de l'amibiase intestinale par l'iodure double d'émétine et de bismuth.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 247–253.

This is an account of the author's experience of the treatment of amoebic cyst carriers by means of double iodide of emetine and bismuth. Marked intolerance resulted in cases where capsules were administered, but keratin coated pills gave very satisfactory results. Details of several cases are given. *Giardia* (*Lamblia*) *intestinalis*, and *E. coli* were only affected temporarily or not at all. It is recommended that the remedy should be tried in large numbers of cases and that observation for long periods should be made to confirm results obtained [see this *Bulletin*, Vol. 6, p. 446, and also below for DALE'S letter].

B. B.

DALE (H. H.). **The Treatment of Amoebic Dysentery.** [Correspondence].—*Lancet.* 1917. May 19. p. 780.

Dale draws attention to the fact that Lieutenant-Colonel Tull WALSH, I.M.S., published an account of the treatment of dysentery by double iodide of emetine and mercury in the *Indian Medical Gazette* so long ago as 1891 (Vol. 26, p. 269); the compound having been prepared by the late Major WARDEN, I.M.S. He notes that DU MEZ had evidently overlooked this fact, of which he (Dale) was also unaware, and he pays a tribute to the accuracy and importance of Tull WALSH'S early observations.

B. B.

KILGORE (A. R.). **Peripheral Neuritis following Emetin Treatment of Amebic Dysentery.**—*China Med. Jl.* 1917. May. Vol. 31. No. 3. pp. 212–216.

The author records seven cases, three adults and four children, who developed symptoms of peripheral neuritis after taking emetine. Muscular weakness, and pain chiefly affecting the lower extremities, tenderness on pressure and interference with reflexes occurred. Wrist drop and toe drop occurred in one case, in another hyperaesthesia of the soles of the feet was the only symptom. The amounts of emetine given to the four children that produced symptoms were grs. 6, 5·5, 4, 4, the ages being respectively 8, 7, 5, 4. The prognosis is good, symptoms clearing up gradually usually over several weeks, leaving no traces apparent. Experiments in progress on dogs suggest that emetine produces peripheral neuritis in them. Previous work by other observers is noted [see this *Bulletin*, Vol. 9, p. 379].

B. B.

FONTOYNONT (M.). **Le traitement de la dysenterie amibienne par le galyl.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 277–279.

The author gives an account of eight cases of amoebic dysentery—all except one diagnosed microscopically—which he treated with galyl, intravenously, and by rectal injection. The results in all cases were good, and no relapse had occurred for four or five months in some of the cases. Two injections into the vein at intervals of two or three days were given, the dose being 0·20 gm. to 0·30 gm. The dose used for rectal injection was 0·10 gm.

B. B.

MATHIS (C.) & MERCIER (L.). **Au sujet du cycle évolutif de l'amibe dysentérique.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1–2. pp. 30–35.

This is a criticism of the views enunciated by JOB and HIRTZMANN [see this *Bulletin*, Vol. 8, p. 117] with regard to the morphology, mode of division and life cycle of *E. dysenteriae.* The authors differ from these writers on most points, but they agree on one or two, for example the unicity of the pathogenic entamoeba and that the name applied should be *Entamoeba dysenteriae.*

B. B.

MATHIS (C.) & MERCIER (L.). **Existe-t-il des kystes à plus de quatre noyaux chez** *Entamoeba dysenteriae?*—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 165–170. With 2 text figs.

In contradistinction to KUENEN and SWELLENGREBEL and SWELLENGREBEL and SCHIESS [see this *Bulletin*, Vol. 3, p. 76, and Vol. 9, p. 423], who state they have found cysts of *E. dysenteriae* containing more than four nuclei, the authors believe that such forms never occur. They adduce some evidence in support of their opinion, including their own observations. They conclude by saying, "To sum up, in the present state of our knowledge, the existence of cysts with eight nuclei in *E. dysenteriae* is not demonstrated, and the observations of Kuenen and Swellengrebel and Swellengrebel and Schiess are, in our opinion, open to doubt. They have not been confirmed by any other author and do not agree with our own observations."

B. B.

MATHIS (C.) & MERCIER (L.). **La schizogonie chez les entamibes intestinales de l'homme.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 311–322. With 15 figs.

The authors state that their observations confirm in part those of JAMES, in as much as they lead them to conclude that *E. coli* possesses two classes of cyst, gamogonous and schizogonous. The differences can be made out in stained preparations, but not so easily in the fresh condition.

Gamogonous cysts possess a thick, double contoured wall, granular siderophile cytoplasm and a delicate alveolar structure; the nuclei are of equal size and never number more than eight. The amoebae which give rise to these forms are always uninucleate and undergo the processes relative to encystment before nuclear multiplication begins. Such cysts are divided as regards size into two nearly equal groups measuring 14μ or 15·5μ in the fixed and stained condition. The former size is that of the microcysts, the latter of the macrocysts. The authors believe that on ingestion these cysts of different sex give rise to small amoebae which copulate. Schizogonous cysts have a thin wall, and are easily deformed, have eosinophile cytoplasm, with a coarsely alveolar structure and often containing large vacuoles like the vegetative amoeba ; the nuclei usually number eight, but may be so high as 16 and are often of unequal size in developing cysts. The amoebae which give rise to these cysts are uni- or multinucleate. The cysts vary in size from 14 to 26μ, usually 17μ in stained preparations. In stools which contain the schizogonous cysts amoebae also are found with 3 to 16 nuclei, of unequal size produced by a process of budding, and not by mesomitotic division which the authors observe to be the process in the gamogonous cysts. The nuclear budding was previously seen by the authors in *E. legeri* of a monkey, and by COLLIN in *E. ranarum*. These schizogonous amoebae may encyst, but the enveloping membrane may be formed either early or late, sometimes before complete expulsion from the cytoplasm of foreign bodies, or after several nuclei already exist. The schizogonous cysts may reach maturity at the moment of expulsion to the exterior, and small amoebae formed of a nucleus and a small amount of protoplasm, have been observed by the authors escaping from such cysts. These small amoebae are considered to be capable of infecting a new host directly, without the intervention of a sexual stage as postulated for the small amoebae derived from gamogonous cysts.

The authors refer to previous work on the question of the schizogonous cycle of *E. coli*. In *E. dysenteriae* they were unable to discover any trace of schizogony. No schizogonous cysts were observed and no motile amoeba containing more than two nuclei. Some conclusions as to the bearing of these observations on the endemicity of *E. dysenteriae* and *E. coli* are added.

B. B.

KNOWLES (R.) & COLE (A. F.). **A Study of Entamoebic Cysts.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 498–610. With 4 plates & 5 charts.

The authors give a summary of some recent literature on the subject of entamoebae and entamoebic cysts and define the scope of this present research which deals chiefly with entamoebic cysts.

Details of 3,000 encysted or resting amoebae were examined and tabulated (about 50 in each of 59 stools from 50 different patients). The technique employed is described. Normal saline made with freshly distilled water was used to make "double Gram" solution (iodine 2 gm., potassium iodide 4 gm., normal saline 300 c.c.) ; 9·5 c.c. of this solution were placed in a 10 c.c. measure and faeces added particle by particle until the total volume reached 10 c.c. The whole 10 c.c. were transferred to a thick glass test tube and by means of grinding with a long glass rod, corking and shaking, a very fine emulsion was obtained. The emulsion was kept till required in the ice chest. A total amoeba count was made using Gower's haemocytometer diluting the original 1–20 emulsion to a suitable amount with saline if necessary. The amoebae are stained and stand out on a white background, and the loss in motility is compensated for by the excellence of the staining effect. Further technical points are dealt with in regard to the making of permanent preparations and the method used by the authors of staining in bulk is described. Starting on the assumption that various species of entamoeba of the human intestine could be distinguished by adopting the usual descriptions as a standard the authors attempted to classify their parasites as *E. coli*, *E. minuta*, and *E. histolytica* vel *tetragena*. They proceeded then to review their findings from various aspects, for example the correlation between the number of nuclei and size of cyst, the size and shape of the nuclei, the number of nuclei present, summarizing the results in tables and in charts. The results of their investigations are clearly set forth and they conclude that there is one species of human entamoeba only.

The conclusions are:—

"(1) The present state of the literature regarding the intestinal entamoeba of man is chaotic. The most divergent views prevail amongst well-known authorities as to (a) the differentiation of species, (b) the pathogenicity of different species, and (c) the differentiation of species when encysted.

"(2) Prior to research work upon the cultivation of entamoeba on artificial media and extensive animal experiment as to pathogenicity, it is necessary to determine exactly (a) the correlation of different amoebic types with dysentery and non-dysentery, and (b) the correlation of intensity of infection in the patient with his state of health.

"(3) The nearest approach to intra-vitam staining of an amoebae is by the double Gram technique, which gives stained organisms on a colourless background. The intensity of infection can be measured by the total amoeba count, as also the relative proportion of amoeboid to encysted forms. To prepare permanent specimens of stained entamoebic cysts we have found it best to stain the faeces in bulk with iron-haematoxylin. The introduction of 'double Gram' renders it possible for specimens to be transmitted by post to a distance for examination, as the solution fixes the amoebae in their natural state, and the emulsion keeps almost indefinitely.

"(4) On examining 365 invalided British soldiers from Mesopotamia we found 20 per cent. infected with *E. coli*, whilst 41 per cent. of cases of acute or convalescent dysentery showed *E. histolytica*. The percentage findings of *E. coli* appear to diminish as the number of patients examined grows larger, and we believe this organism to be rarer than is usually stated. Our positive *histolytica* finding is larger than that of other observers.

"(5) During the process of encystation the amoeba comes down from an amoeboid form of varying size to a spherical and resting precyst of usually smaller size. The process of shrinkage continues until the 4-nucleate stage is reached, which was the smallest form observed in an examination of 3,000 resting or encysted amoebae. Subsequently, with the addition of more nuclei, the cyst enlarges slightly and regularly. Nuclear multiplication may go on to the formation of 10, 12, 16 or even more nuclei.

"(6) Throughout the examination of 528 stools for entamoeba we constantly found difficulty in deciding between *E. coli* and *E. histolytica*. The diagnosis for a given patient might vary from day to day as regards the type of cyst prevalent, whilst the presence of the amoebae was also markedly intermittent. Amoeboid forms resembling *E. histolytica* were found in patients who denied all history of dysentery, whilst cysts of *E. coli* might be the prevailing type of organism in cases of acute dysentery which were still passing blood and mucus. If different species exist, then they are usually simultaneously present in both acute and convalescent dysentery cases.

"(7) 1, 2, 4, and 8 nucleate cysts are present in both dysentery and non-dysentery, although the prevalent type of cyst in dysentery and non-dysentery is different. This finding is not inconsistent with the view that entamoebic species are, in reality, one and the same, and that amoebic dysentery is due to a single protozoal organism, usually present as a harmless commensal, but able, under certain conditions, to waken into pathogenicity.

"(8) The differences between the amoeboid forms of entamoebic species are relative, subject to variation, and not absolute.

"(9) 1, 2, 4, and 8 nucleate cysts are met with in both *E. coli* and *E. histolytica* infections. The tetranucleate cyst was rare in our findings for both 'species.' It is already admitted by many authorities that *E. histolytica* may form an 8-nucleate cyst.

"(10) There is no differentiation between the species as regards size of cysts.

"(11) The differences in nuclear detail between the species *E. coli*, *E. minuta* and *E. histolytica* are not inconsistent with the view that the latter two 'species' are the less adult forms of the former.

"(12) The 'species' show no distinctive difference as regards the contour, glycogen content, vacuolation and presence of 'chromidial rods' in the cysts.

"(13) *E. tetragena* is usually regarded as identical with *E. histolytica*, and our results confirm this view. *E. minuta* is usually regarded as the pre-cyst of *E. histolytica*; whereas we have found *minuta* forms associated with both *E. coli* and *E. histolytica.* Where the prevalent type of organism was *E. minuta* it was commonly in association with 8 nucleate cysts, and resembled *E. coli.*

"(14) We believe that these 'different species' are all one and the same organism. We suggest that the name *Entamoeba coli communis* should replace the terms *E. coli, E. histolytica, E. minuta, E. tetragena*, etc.

"(15) *E. coli communis* is then the common entamoeba of the human intestine, usually non-pathogenic, but liable on occasion to become pathogenic, and to cause the lesions of dysentery and amoebiasis. The determination of the total amoeba count, together with that of the prevalent type of amoeboid or encysted form present, will enable the observer to state (a) whether the amoeba is in its pathogenic state or otherwise; (b) what is the patient's progress from day to day; and (c) whether the convalescent is or is not a possible carrier.

"(16) We have found that daily enemata of 1 in 80 mag. sulphas are of value as an adjuvant to emetine treatment."

B. B.

SHIMURA (S.). [**Non-Pathogenic Form of** *Entamoeba tetragena.*]—*Tokyo Igakukai Zassi.* 1916. Oct. 5. Vol. 30. Nov. 19. pp. 1–27. [Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. pp. 173–174.]

During the course of the study of the stools of healthy individuals the author encountered some specimens of typical (?) dysentery amoeba, which in those particular cases were apparently not producing any symptoms. The absolute lack of symptoms and the proctoscopic examination of every case indicated that, so far as determinable, there were no associated intestinal lesions, except a chronic colitis in one individual. Repeated examinations were made over a period of eight months, sometimes with salts and sometimes without, and the results were constantly the same—the vegetative form in the liquid stool and the cysts in the formed ones. There are, however, a few points in which this non-pathogenic form is different from the ordinary pathogenic species. The vegetative form ranges in size between 15–25μ, and the so-called small vegetative form between 6–19μ, on an average smaller than the corresponding forms of the pathogenic variety. The movement is sluggish, the rounded transparent pseudopodia being pushed out at any desired position. During rest the ectoplasm is with difficulty distinguished from the endoplasm. The protoplasm never contains erythrocytes, but numerous bacteria and nutrient particles. The change in form is not rapid and the protoplasmic streaming is correspondingly slow. The nucleus is decidedly vesicular, 1·5–4μ in diameter, contains a nucleolus, a zone of nucleoplasm, and is surrounded by a thick nuclear membrane with abundant peripherally arranged chromatin. The cyst formation is typical, there is the decrease in size from the discharge of all foreign matter, the extrusion of some small chromatids, and finally the breaking up into four—never into eight—daughter nuclei. There are apparently about four different ways in which the nucleus makes this division.

Experimentally also, these non-pathogenic amoebae were distinguished from the dysentery-producing ones. The cysts were somewhat concentrated by thorough emulsification of the faeces and straining through gauze. The filtrate was then centrifuged, washed with saline solution and again concentrated. This sediment, rich in cysts, was injected into young cats *per rectum* and some fed to others by mouth. Three cats were successfully infected by the latter method and passed the vegetative forms in the stools, which were never diarrhoeic and indicated no intestinal disturbance. The controls given the dysentery-producing form were infected with dysentery symptoms in 91 per cent. of the injected cats, and 50 per cent. in those given the sediment by mouth. The animals infected with the non-pathogenic type were finally killed and the intestine examined macroscopically and microscopically, but no lesion could be found.

[It is of interest to read in connection with this the paper by YORKE, CARTER, MACKINNON, MATTHEWS and SMITH. See above, p. 128.]

B. B.

DOBELL (Clifford) & JEPPS (Margaret W.). **On the Three Common Intestinal Entamoebae of Man, and their Differential Diagnosis.**—*Brit. Med. Jl.* 1917. May 12. pp. 607–612. With 14 figs.

The authors say they have long known that the cysts of *E. histolytica* have a far greater range of size than has commonly been stated. They mention a case in which *histolytica* cysts were regularly passed measuring 7 to 8μ. They proceed to give a description of the parasite described by SWELLENGREBEL and WINOTO, and WENYON and O'CONNOR and named by the latter *Entamoeba nana*. Of the cysts of this entamoeba they state:—

> "The cysts are oval or spherical structures, usually measuring 8 to 10μ in length or 7 to 8μ in diameter. The nuclei are 1, 2, or 4 in number in the vast majority of cysts, closely resembling in structure those of the unencysted amoebae, except for their smaller size in late stages of development. . . . In the quadrinucleate cyst the nuclei usually lie near to one another, and frequently in close contact. Very rarely cysts have been observed containing as many as eight nuclei."

Of the nucleus of the unencysted amoebae is stated:—

> "The very characteristic nucleus is rather small, and not always easily observable in the living organisms. Its karyosome is smaller than that in the nucleus of a typical *A. limax*, and usually occupies an apparently excentric or peripheral position. It is usually irregular in shape and often segmented into several pieces of unequal size united by slender threads."

The authors have found this amoeba in dysentery convalescents and non-dysenterics and have no evidence that it is pathogenic. They consider it probably harmless on account of its similarity in food habit to *E. coli* and because they find it also is uninfluenced by emetine bismuth iodide.

A section deals with *E. histolytica*. Of a series of 200 cases of infection with this organism 62 were found in which cysts were passed which never exceeded 10μ in diameter and 13 others in which cysts were found below as well as above this diameter. The authors consider these all to be strains of *histolytica* cysts, and further they state that they have no reason to believe that these strains of *E. histolytica* differ from one another in pathogenicity or any other character save size. All strains behave in a precisely similar manner towards treatment with emetine, given either hypodermically or as the double iodide per os. In discussing the term *E. minuta*, the authors point out that it is not properly applied to the strains of *E. histolytica* forming small cysts. There can no longer be any doubt that the organism described as *E. minuta* by ELMASSIAN (1909) was the ordinary strain of *E. histolytica* forming cysts of the larger size.

In the diagnosis between *E. coli* and *E. histolytica* cysts the authors consider size unreliable, as also the presence of chromatoid bodies and the thickness of the wall. The character which they rely on is the number and structure of the nuclei.

B. B.

ARAGÃO (Henrique de Beaurepaire). **Algumas observações relativas ás endamebas dysentericas.**—*Brazil Medico.* 1917. Mar. 31 & Apr. 7. Vol. 31. Nos. 13 & 14. pp. 105–106, 113–114.

In the first section of this paper the various appearances of the nucleus of the dysentery amoeba are discussed, and next the modifications observed in the protoplasm, and finally some of the objects which may simulate amoebae in the faeces are mentioned. The structure of normal amoebic nuclei and protoplasm is described, and the author considers that from a mere inspection of a preparation one can decide whether the amoeba is living under the best conditions of environment. Variations in the shape of the nucleus and in the amount and arrangement of chromatin are discussed. An excess of chromatin arranged in more or less regular masses round the periphery is frequently observed, and even passing in towards the caryosome. The protoplasm of amoebae which present nuclear alterations also undergoes modification, the more degenerate forms containing vacuoles with only fragments of red cells and many bacteria.

The second section deals with the nomenclature of the parasitic Endamoebae of Man. The author considers that *Endamoeba dysenteriae* and *Endamoeba histolytica* should be called by the name first applied by LOESCH, *Endamoeba coli*, while the parasite commonly known as *E. coli* should be called *Endamoeba intestinivulgaris* (Quincke & Rooss, 1893).

B. B.

CARLES (Jacques) & BARTHÉLEMY (Ed.). **Procéde spécial d'homogenisation et de tamisage pour collecter les kystes dysentériques contenus dans le selles.**—*C.R. Soc. Biol.* 1917. Apr. 21. Vol. 80. No. 8. pp. 402–403.

Twenty grammes of faeces are placed in a 125-c.c. measuring glass and to this amount is added sufficient diluting fluid to make a homogeneous emulsion, stirring with a glass rod. Filter through silk 90 meshes to the centimetre. The liquid obtained is distributed in tubes and centrifuged for 1 minute at 1,800 revolutions. Remove the supernatant fluid and mix the deposit with the following:—

Citric acid	12 gm.	D = 1·047
Water	86 „	
40 per cent. Formol ..	2 „	

Add 1 to 2 c.c. sulphuric ether and shake strongly; centrifuge 30 seconds at 1,800 revolutions. The zone of separation of the ether and liquid, where some cysts may have been entangled, is scraped with a closed pipette and the whole centrifuged again for 30 seconds as before. The supernatant fluid is removed. The deposit now contains, it is claimed, little else besides cysts of protozoa, oocysts of sporozoa, and ova of helminths.

B. B.

INMAN (A. C.); McLEAN (R. C.). **The Detection of *Entamoeba histolytica* and its Cysts: Notes on the Technique for Conducting Examinations of Human Faeces.**—*Lancet.* 1917. June 30. pp. 990–991. July 14. p. 63.

Inman uses the following stain for food debris, bacteria, etc., in suspensions of faeces:—

Fuchsin, 1 gm., dissolved in 5 c.c. liquid carbolic acid. To this are added 50 c.c. glycerine and 10 c.c. distilled water. For use take 1 part of the stain to 12 parts distilled water. In order to obtain a contrast effect a 500 c.c. flask full of distilled water to which is added 1 drop of a 1 per cent. aqueous solution of methylene blue, is placed in the path of the rays from the microscope lamp. The cysts appear bluish white, lying among the red stained debris, and chromatoid bars appear light blue. In order to overcome the agglutinative effect which iodine solutions have on faecal suspension the author recommends the addition of glycerine. The solution used by him consists of iodine, 1 gm.; Pot. Iod., 2 gm.; Aq. dest., 200 c.c.; add 1 drop of glycerine to every 10 c.c. of this solution.

McLean criticises and comments upon Inman's paper.

B. B.

MARTY (L.). **Emétine et Histolyse des amibes dysentériques.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 445–446.

The author finds fixation in acetic formol, washing in absolute alcohol and 24 hours' staining with Giemsa a good method for studying the effects of emetine on amoebae and cysts. He concludes from his observations that cysts are affected by emetine as well as motile forms, but the nuclei are not affected.

B. B.

JOLLOS (Victor). **Untersuchungen zur Morphologie der Amöbenteilung.** [The Morphology of Division in Amoebae.]—*Arch. f. Protistenk.* 1917. May 14. Vol. 37. No. 3. pp. 229–275. With 4 plates & 4 text figs.

After a brief account of the origin and cultivation of his material and the methods employed for fixation and staining the author describes the structure of and mode of division in *Vahlkampfia magna* n. sp. from an infusion of stable refuse, *V. debilis* n. sp. from flaxwater, and *V. lacertae* from the gut of *Lacerta agilis*. The chief facts concerning the constitution of the nucleus and its division in Vahlkampfia are summarized. *Hartmanella aquarum* n. sp. from flaxwater is next described, and its nuclear structure and division compared with Vahlkampfia.

In a section on the classification of amoebae the author rejects the old method of distinguishing them by the characters of the pseudopodia, the nature of the protoplasm, etc., and considers the basis of a sound classification to be the character and mode of division of the nucleus, as indicated by HARTMANN, NÄGLER and others. From his observations on this subject the author is enabled to divide the amoebae studied by him into two groups presenting different types of nuclear division. Further he insists on the affinities of the whole of the Vahlkampfia with the Protomonadina. The whole group he calls by the family name Vahlkampfidae, the generic term *Vahlkampfia* being confined to those forms which have no flagellate stage; those having a bi-flagellate stage are placed in the genus *Nägleria* (Calkins), while the third genus *Trimastigamoeba* (Whitmore) is reserved for that form which presents a tri-flagellate stage. There is a discussion on the caryosome and centriole and their relation to nuclear division and finally a somewhat animated criticism of DÖFLEIN'S views in general, and his views on the HARTMANN school in particular.

B. B.

CHALMERS (Albert J.) & O'FARRELL (W. R.). **A Case of Urinary Amoebiasis in the Anglo-Egyptian Sudan.**—*Jl. Trop. Med. & Hyg.* 1917. May 1. Vol. 20. No. 9. pp. 97–100. With 1 fig.

The authors in their paper draw attention to the scantiness of the existing records of amoebic infection of the urinary tract. They consider that the condition is probably overlooked in many instances owing to the fact that amoebae in the upper part of the urinary tract may undergo considerable changes before being passed in the urine. The work of Scott MACFIE is referred to and quoted [see this *Bulletin*, Vol. 9, p. 185], and the authors lay stress upon his observations on the deleterious effects of exposure of amoebae to prolonged action of urine. One of the authors has at various times during his 20 years' experience in the tropics observed precystic or cystic stages of amoebae in the urine, but has never found motile forms. Accepting the fact that acid urine will exercise more effect upon amoebae which proceed from high up in the urinary tract, the known cases of urinary amoebiasis are reviewed and placed in categories of Infection: (a) Low down in the urinary tract; (b) High up in the urinary tract; (c) Site in the urinary tract unknown.

Details of a case of infection in a woman in Khartoum are given. From the clinical history, localising symptoms, the appearance of the amoebae found, the sterility of the urine, and the beneficial effects of emetine treatment the authors consider the case to have been one of right amoebic pyelitis.

[For papers on this subject, see this *Bulletin*, Vol. 3, p. 457; Vol. 5, p. 200; Vol. 6, p. 52; Vol. 8, p. 118.]

B. B.

WRIGHT (E. J.). **A Case of Urinary Amoebiasis with Cystitis.**—*Jl. Trop. Med. & Hyg.* 1917. July 2. Vol. 20. No. 13. pp. 145-146.

This paper gives details of a case of cystitis in a pregnant woman in Sierra Leone. Severe symptoms were present, frequent and painful micturition of small quantities of turbid urine containing albumin and blood. Amoebae were found in the centrifugalised deposit together with bladder epithelial cells, blood corpuscles red and white, and pus cells. No renal casts were found. Emetine was administered hypodermically and also into the bladder after washing it out with boracic acid lotion. The condition cleared up and no ill effect on the pregnancy was observed. The patient received a total of 9–12 grs. emetine hypodermically and 2 grs. in ½-gr. doses in ½ oz. water into the bladder. Dr. YOUNG, M.O. i/c Laboratory Colonial Hospital describes the amoeba found. The average size was 20–25μ, the variation being from 10 to 40μ; ectoplasm and endoplasm easily distinguished, vacuoles present and ingested erythrocytes; nucleus round, vesicular, nuclear membrane distinct with interrupted chromatin masses attached; motility sluggish; cysts numerous with one, two or three nuclei or four nuclei; diameter, 20–25μ.

B. B.

LUDLOW (A. I.). **Abscess of the Liver.**—*China Med. Jl.* 1917. May. Vol. 31. No. 3. pp. 207–212.

Since 1912 the author has operated on 30 cases of liver abscess; of these four died. He discusses the relative value of various methods of treatment and describes his own operation. In five of the cases rupture into the pleural cavity and in six rupture into the abdominal cavity had occurred before operation. Many of the cases were probably amoebic, in the opinion of the author, as in the district amoebic dysentery is not uncommon. He did not find the use of emetine of much assistance.

B. B.

BACILLARY DYSENTERY.

MEDICAL RESEARCH COMMITTEE. NATIONAL HEALTH INSURANCE. **Reports upon Investigations in the United Kingdom of Dysentery Cases received from the Eastern Mediterranean. II.—Report upon 878 Cases of Bacillary Enteritis.** (By L. RAJCHMAN & G. T. WESTERN)—*Special Report Series.* No. 5. 103 pp. 1917. London: H. M. Stationery Office. [Price 1*s.* 6*d.* net.]

This report is too long and complex to be summarised in this *Bulletin.* There is an excellent introduction dealing with the history of the pathology of dysentery up to the present day. To one who is thoroughly conversant with the current literature on the subject, the investigation itself does not contain anything that is really new. It rather goes to confirm other people's work, and from that point of view, owing to the large amount of the material handled, it is interesting.

E. E. Atkin.

MALLOIZEL & DATESSEN. **Epidémies de Bretagne (1916). 1° La vraie dysenterie bacillaire (Dysenterie maligne épidémique à bacille de Shiga). 2° La dysenterie bénigne (Dysenterie légère épidémique à bacille de Hiss-Flexner.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Feb. 8. 3 Ser. Vol. 33. No. 3-4. pp. 143-168.

The dysentery of the war has been much milder than that endemic in Brittany previously. During 1916 two distinct varieties could be observed.

1. An epidemic of a mild type located chiefly at Brest and Nantes, resulting in a mortality of not more than 2-4 per cent. This was associated with the Flexner-Y bacillus.

2. A malignant type such as appears each year at the cider-making season. It was especially prevalent in the Haute-Cornouaille at Gourin, Carhaix, Guiscriff and their neighbourhoods. It reached its maximum in September and October. Whole families were often eliminated. Cold is a definite factor in the causation of the disease. The incubation period is 3-8 days and the disease is caused by *B. dysenteriae* Shiga as this organism was isolated from the faeces of many of the patients. The patients' blood also agglutinated stock Shiga cultures.

Antidysenteric serum was found to do good in both types of the disease, but especially in the malignant form when given early and in large doses.

E. E. A.

SANGIORGI (Giuseppe). **Dissenteria bacillare epidemica nel Trevigiano.** [An Outbreak of Bacillary Dysentery in the District of Treviso, Italy.]—*Giorn. di Med. Milit.* 1916. Dec. 31. Vol. 64. No. 12. pp. 915-918.

An account of an outbreak of bacillary dysentery at Zero Branco, in the province of Venetia. The cases numbered about 100 of all ages and both sexes. The mortality was 4 per cent. Pollution of water-supply could be excluded, the locality being furnished exclusively with water from deep artesian wells. Direct contact could be proved in the majority of cases. The bacillus isolated corresponded in every case to the Hiss-Russell type of dysentery bacillus by laboratory tests, and agglutinated with the serum of convalescents in a strength of 1 : 300.

J. B. Nias.

JACOB (L.). **Ueber eigenartige Rezidive bei Bazillenruhr.** [Relapses in Bacillary Dysentery.]—*Münch. Med. Woch.* 1917. Jan. 23. Vol. 64. No. 4. pp. 125-127. With 10 charts.

The author has observed relapses in a number of cases of dysentery that had been free from fever for some time. The temperature rises again with great regularity between the 19th and 22nd days of the disease counting from the day when blood and slime were first noticed. The period of normal temperature preceding the relapse varied from one to three weeks according to the duration of the initial outburst of fever. In most cases it could be predicted from the fact that the patients did not put on weight although on full diet. Intestinal symptoms were rare but a few of them had a return of diarrhoea without blood and in these instances Flexner's bacillus was isolated from the faeces. General symptoms however were prominent, such as headache, joint pains, loss of appetite and a feeling of lassitude. Owing to the difficulty of examining the stools while still fresh dysentery bacilli were only found in a small proportion of the cases but both Shiga and Flexner types were isolated.

E. E. A.

GLUZIŃSKI (Anton). **Kritische Betrachtungen zur sogenannten ulzerösen Entzündung des Dickdarms (Colitis ulcerosa, Colitis gravis, Colitis chronica purulenta) und zum Verhalten dieses Leidens zur Dysenterie.** [Critical Remarks on the So-Called Ulcerative Inflammations of the Large Intestine and their Relation to Dysentery.]—*Wien. Klin. Woch.* 1917. May 3. Vol. 30. No. 18. pp. 549–553.

An attempt, on very slender evidence, to show that the cause of a single case of ulcerative colitis was *B. dysenteriae* Flexner. The specific bacillus could not be isolated from the faeces, but the patient's serum gave an agglutination with a certain strain of Flexner's bacillus in a dilution of 1 : 150, which is hardly outside the upper normal limit for this species of dysentery bacillus. Several other races of Flexner were not agglutinated at all in a 1 : 50 dilution. [Although this case is not at all convincing, it is well to bear in mind that dysentery may be a possible cause of at any rate some of the cases of chronic ulcerative colitis.]

E. E. A.

ASCOLI (Alberto). **Contributo alla conoscenza della dissenteria da Shiga-Kruse.** [A Contribution to the Study of Shiga-Kruse Dysentery.]—*Boll. Soc. Med. Chirurg. di Modena.* 1916. Jan.-Dec. Vol. 18. pp. 33–48.

A paper of little general interest discussing the findings in a single case of suspected bacillary dysentery. Whilst the bacilli isolated failed to agglutinate with either Shiga-Kruse or Flexner standard serum, inoculated rabbits showed a paralysis of the limbs such as is characteristic of Shiga bacilli.

J. B. N

SKALSKI (Stanislaw) & STERLING (Stefan). **Die spezifische Vakzinetherapie bei bazillärer Ruhr.** [Specific Vaccine Therapy in Bacillary Dysentery.]—*Deut. Med. Woch.* 1917. June 7. Vol. 43. No. 23. pp. 713-715.

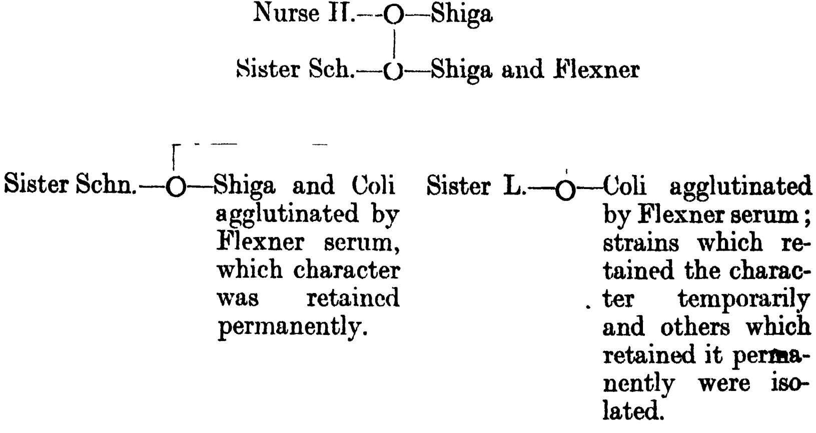
A report on the treatment of some dysentery cases (Flexner type) by vaccines. A start was made with about 25–50 million bacilli killed by heat for an hour at 55–58° and 0·5 per cent. phenol added; 2–4 doses of increasing size were injected subcutaneously at 48 hour intervals. Many different varieties of vaccine were tried. The fact that the authors record that the symptoms began to subside immediately after an injection, appears to the writer to indicate that they do not understand the principles of vaccine therapy. There are in fact no data in the paper by which one can judge whether the vaccines did good or not.

E. E. A.

SACHS-MUEKE. **Beobachtungen über die agglutinierende Wirkung specifischer Ruhrsera auf andersartige Bakterien aus den Stühlen Ruhrkranker.** [Observations on the Agglutinative Action of Specific Dysentery Sera on Other Kinds of Bacteria in the Stools of Dysentery Patients.]—*Med. Klinik.* 1917. Feb. 11. Vol. 13. No. 6. pp. 155–158.

As the title suggests, this article deals with para-agglutinable bacteria. It may be worth while explaining that in dysenteric stools one often finds non-pathogenic bacilli of the *B. coli* type (and even cocci), which have acquired the power of being agglutinated by specific dysentery agglutinating serum. The point made by the author is that they will be of great diagnostic importance in the future. The concept is at present a new one and the pitfalls which are invariably present in such cases will have to be laid bare before it can be put on a sound working basis. Para-agglutinable bacteria, differing as they do in all save agglutinative properties from the true infective agents, may serve as "leading bacteria" to the latter, stimulating a search for the dysentery or other pathogenic bacillus as the case may be. If a bacillus is isolated from a stool, which culturally is obviously *B. coli* but happens to be agglutinated by a specific *B. dysenteriae* Flexner serum, it further suggests testing the agglutinating power of the patient's serum on Flexner's bacillus. It is usually found to be positive and several cases are cited in which this is so.

Most workers accept as one of the characteristics of these races, the fleeting nature of the susceptibility to agglutinate. The author has met several strains, however, which when cultivated on artificial media permanently retain this property. Furthermore he has noticed that the strains take some time to develop and are not to be isolated from rapidly fatal cases. The following scheme of contact cases is interesting :—



Nurse H.—O—Shiga

Sister Sch.—O—Shiga and Flexner

Sister Schn.—O—Shiga and Coli agglutinated by Flexner serum, which character was retained permanently.

Sister L.—O—Coli agglutinated by Flexner serum; strains which retained the character temporarily and others which retained it permanently were isolated.

In the last case (Sister L.) strains which rapidly lost the character of para-agglutination when cultured on artificial media preceded and succeeded those retaining the character permanently, but were not isolated simultaneously. For this reason the author considers it probable that they are links in the chain of evolution to and from the permanent form.

E. E. A.

FLATZEK (A.). **Die Paragglutination von Kolibakterien mit Ruhrserum.** [Para-Agglutination of *B. coli* with Dysentery Serum.]—*Deut. Med. Woch.* 1917. Feb. 15. Vol. 43. No. 7. pp. 200–202.

The investigations of recent years all go to show that the interpretation of agglutination reactions is by no means the cut and dried process that it was originally supposed to be. One of the greatest pitfalls is in connection with the so-called para-agglutinable bacilli. As is now well known *B. coli* and even intestinal cocci can acquire the property of being agglutinated by specific dysentery or typhoid agglutinating sera for instance, when growing in association with these pathogenic organisms. This condition can also be induced *in vitro.* Group agglutination on the other hand is the agglutination by a specific serum of a closely allied bacterium, say *B. paratyphosus* B by a typhoid agglutinating serum. A point of distinction is brought out by means of the CASTELLANI absorption method. When a Shiga agglutinating serum is treated with para-agglutinable *B. coli,* not only is the *B. coli* agglutinin absorbed but also that for Shiga's bacillus; on the other hand a paratyphoid bacillus will only remove its own specific agglutinin from a typhoid serum leaving the typhoid agglutinin intact.

These facts show that in order to avoid errors it is necessary to employ fermentation reactions in addition to agglutination.

E. E. A.

SCHMIDT (P.). **Zur Frage der Brauchbarkeit der Serum-Agglutination bei Ruhr.** [The Use of Serum-Agglutination in Dysentery.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Vol. 81. pp. 57–62.

The sera of *normal* persons is sometimes found to agglutinate dysentery bacilli (Shiga, Flexner, etc.). This is not an evanescent phenomenon. One gets the impression that this property of the serum is somewhat increased by non-specific active immunisation with typhoid and cholera organisms. It cannot be an instance of group agglutination of dysentery bacilli, since individuals who have not received typhoid or cholera vaccines possess this faculty. This shows us that in choosing a laboratory culture of dysentery bacilli for agglutination purposes we must be careful to eliminate those strains which are prone to give non-specific clumping by testing them with many normal sera. With regard to the agglutination of *B. dysenteriae* Shiga, a positive result with a serum dilution of 1 : 50 is only valid after 2–3 hours incubation. If a longer period, say 20 hours, is allowed before the results are read a positive result with a dilution of 1 : 100 at least must be obtained. In the case of *B. dysenteriae* Flexner a serum dilution of 1 : 200 is necessary with 2 hours' incubation.

E. E. A.

LANCELIN (R.) & BIDEAU (I.). **A propos du temps nécessaire à l'agglutination microscopique des bacilles du groupe dysentérique.**—*C. R. Soc. Biol.* 1917. Mar. 3. Vol. 80. No. 5. pp. 267–268.

The microscopic agglutination of the typhoid group is complete in a quarter of an hour. This is not always the case with the dysentery group. Some sera agglutinate the bacilli in this short time, but the majority require a longer period and it advisable to allow them a full hour. After this it is found experimentally that clumping does not increase.

E. E. A.

DEBAINS (E.). **Sur les bacilles du groupe Flexner-Y.**—*Ann. Inst. Pasteur.* 1917. Feb. Vol. 31. No. 2. pp. 73–83.

Confusing results were obtained as regards the agglutination of this group of dysentery bacilli; for instance one strain which was said to be *B. dysenteriae* Y was agglutinated better by an anti-Shiga than by an anti-Flexner serum.

The author's experiments go to show that the pathogenicity of the Flexner-Y group is not due to the virulence of the organisms but rather to a toxin analogous to, but not identical with, that of Shiga's bacillus from which it differs in being much less stable.

E. E. A.

i. MARTIN (C. J.) & WILLIAMS (F. E.). **Notes on the Etiology of Dysentery. I. Types of Dysentery Bacilli isolated at No. 3 Australian General Hospital, Cairo, March-August, 1916, with Observations on the Variability of the Mannite-Fermenting Group. II. The Value of Agglutination in the Identification of Members of the Mannite-Fermenting Group of Dysentery Bacilli.**—*Brit. Med. Jl.* 1917. Apr. 14. pp. 479–480.

ii. MARTIN (C. J.), KELLAWAY & WILLIAMS (F. E.). **III. Epitome of the Results of the Examination of the Stools of 422 Cases admitted to No. 3 Australian General Hospital, Cairo, for Dysentery and Diarrhoea, March to August, 1916.**—*Ibid.* p. 480.

The cases cited were presumably of Egyptian origin; 217 stool examinations were made. Shiga was isolated 47 times and mannite-fermenting dysentery bacilli 76 times. *E. histolytica* or its cysts were present in 63 cases, while in 36 no causative organism was detected. As is usual the Shiga strains were very constant, but the mannite-fermenters were the reverse as regards their action on certain carbohydrates. Some of the latter were examined six months after isolation, having been subcultured several times in the meanwhile.

> "Out of the 3 originally fermenting saccharose, 2 had lost this property. Of the 21 which originally fermented maltose 5 had lost the power and other 5 had acquired it; 4 out of 13 had lost the power to split sorbite, and other 2 had acquired it. In 6 cases the action upon raffinose was reversed, 3 ceasing to ferment this sugar and 3 gaining this faculty. The production of indol was the most variable, the property being lost in 9 cases and acquired in 4."

Nearly one-sixth of the mannite fermenters were not agglutinated by a Y serum immediately after isolation, but six months later four out of eight of these strains were agglutinated by the same serum.

E. E. A.

SELIGMANN (E.). **Zur Bakteriologie der Ruhr im Kriege.** [The Bacteriology of Dysentery in the War.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Jan. 30. Vol. 79. No. 2. pp. 71–79.

An investigation of dysentery epidemics during the war has shown that the well-known types (Shiga and Flexner bacilli) only appear towards the height of the epidemic. What then is the connecting link between two epidemics ? The author does not think that carriers or remnants of past outbreaks play an important part. He puts forward the revolutionary view that Shiga and Flexner bacilli arise anew as types, by a gradual evolution through aberrant forms which are found in the beginning of an epidemic. He isolated organisms bearing a close relation to the disease, ranging from a gas-forming bacillus resembling *B. coli*, through inagglutinable strains of dysentery bacilli, to the true types.

E. E. A.

GOSIO (B.). **Valore batterio-diagnostico dell' arbutina con speciale riguardo ai bacilli dissenterici.** [The Diagnostic Value of Arbutin for Dysentery Bacilli.]—*Ann. d'Igiene.* 1917. Apr. 30. Vol. 27. No. 4. pp. 213–218.

Arbutin is a glucoside present in large quantities in the plant *Arctostaphylos Uva-ursi* and other plants belonging to the order Ericaceae. In neutral aqueous solutions it is fairly stable, being only altered at the temperature of superheated steam. In solutions of acid reaction, however, and especially such as possess hydrolyzing power, it is easily decomposed into glucose and hydroquinone, the solution quickly becoming blackened by the oxidation of the latter by the oxygen of the atmosphere. The author finds that by adding arbutin in the proportion of 1 to 200 to ordinary agar media, a method is found for differentiating various species of bacteria. While *B. pyocyaneus*, *B. coli* and *paracoli*, and similar para-dysenteric organisms quickly darken the medium by their action on the arbutin with liberation of hydroquinone, *B. typhosus*, the two para-typhoids, *B. anthracis*, *B. pestis* and *Streptococcus pyogenes* do so much more slowly, and the true dysentery bacilli, both Shiga-Kruse and Flexner, do not react at all. The medium, therefore, remains colourless in the latter case. The author recommends this reaction as a serviceable method for distinguishing true dysentery bacilli from others.

J. B. N.

GASSNER (G.). **Der Metachromgelb-Wasserblau - Dreifarbennährboden für Typhus - Ruhr - Untersuchungen.** [The Metachromyellow-Water-Blue-Three-Colour-Medium for Typhoid and Dysentery Investigation.]—*Münch. Med. Woch.* 1917. Apr. 10. No. 15. pp. 505–506.

The advantages claimed for this medium, which contains the two dyes mentioned in the title, is that both lactose and non-lactose fermenting colonies change colour. The colour of the medium itself is green ; bacteria which produce acid from the sugar present become deep blue while those that do not ferment the sugar assume a clear yellowish tint.

E. E. A.

FLAGELLATE DYSENTERY.

CHATTERJEE (G. C.). **Note on Flagellate Dysentery.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 393–401. With 5 plates.

The author says:—

> "Though it is true that some varieties of flagellates are harmless inhabitants of the intestinal cavity, it is beyond doubt that some varieties are pathogenic, when they occur in large numbers, and when no other causative organism can be found to account for the intestinal troubles. Accordingly though flagellate dysentery cannot take the same rank with amoebic or bacillary dysentery, it is a distinct entity."

In 70 cases during the last three years the author has identified the parasites. He gives a description of the symptoms and of the organisms concerned. An enumeration in tabular form of his cases shows three cases with choleraic stools attributed to *Monocercomonas* and two to *Prowazekia*, 18 cases of chronic dysentery due to *Macrostoma* (the author states he was unable to find any trace of flagellum in the cytostome, even with dark ground illumination), 15 to *Lamblia*, 32 to *Pentatrichomonas*. The author tried cultivation on Musgrave's media. The organism which was under observation in the stool failed to grow as a rule, but other organisms grew, most frequently *Amoeba limax*, and in two cases a Bodo.

B. Blacklock.

LOGAN (A. H.) & SANFORD (A. H.). **The Significance of *Lamblia Intestinalis* in Stool Examinations.**—*Jl. Lab. & Clin. Med.* 1917. June. Vol. 2. No. 9. pp. 618–621. With 1 fig.

In a total of 6,000 cases, from all parts of the United States, examined the authors found lamblia present in 66 cases, in 41 of which it was the only organism which could be held responsible for the symptoms. Various examinations were made on groups of these patients, for example proctoscopic examination in 10, examination of stomach contents in 12, blood examination in most of them, roentgenographic examination of the stomach with barium in 6. The authors conclude that *Lamblia intestinalis* should probably be considered pathogenic. Treatment by thymol gave the best results, but the removal of lamblia was found difficult to effect.

B. B.

YAKIMOFF (W. L.), WASSILEVSKI (W. J.) & ZWIETKOFF (N. A.). **Sur la chimiothérapie de la lambliose.**—*C. R. Soc. Biol.* 1917. May 19. Vol. 80. No. 10. pp. 506–507.

The authors give in this paper a short account of an experimental treatment of mice naturally infected with *L. muris* by intravenous injection of salvarsan. Using a dilution of 1–300 to 1–1,200 prolonged sterilization was effected by the intravenous injection of 1 c.c. solution per 20 grammes mouse. *Octomitus muris* Grassi was not affected in 2 of the 7 animals treated. The observation periods were, in days, 34, 76, 93, 21, 102, 75, 73.

B. B.

BEJARANO (Jorge). **Una observación de tricomonas (?).**—*Repertorio de Med. y Cirug.* 1917. Jan. Vol. 8. No. 4. (No. 88). pp. 169–176.

Bacillary dysentery and amoebic dysentery have an individuality from the clinical aspect which cannot be claimed, the author believes, for the so-called dysentery caused by Trichomonas. The clinical history is given of a woman who for a long period had dyspeptic and diarrhoeic symptoms and who was passing Trichomonas. Various treatments were adopted with little effect. Rectal injections of iodine, 50 cgm. in 1,500 c.c. water, caused great pain and had to be given up. He questions whether real dysentery caused by Trichomonas occurs. Neither the work of ESCOMEL nor that of VILLA suffices in his opinion to establish its occurrence.

B. B.

HADLEY (P. B.). **The Part played by the Goblet Cells in Protozoan Infections of the Intestinal Tract.**—*Jl. Med. Res.* 1917. Mar. Vol. 36. No. 1. Whole No. 161. pp. 79–86. With 1 plate.

In a previous paper, states the author, he has been able to show that Trichomonas may cause extensive lesions in the subepithelial regions of the intestine just as amoebae do. In the coeca of birds the mode of invasion was studied during the past year and it was found that the flagellate gained access to the deeper tissues through the goblet or chalice cells located in the epithelial walls deep in the crypts of Lieberkühn. The author traces in detail the passage of the flagellates through these cells to the subepithelial layers. He finds himself unable to believe that the penetration is purely mechanical in origin and thinks that the cells are invaded owing to the result of "natural invasive ability on the part of the flagellate trophozoites." The fundus of the gland cells is affected almost exclusively. The epithelium becomes loosened by multiplication of the parasites, which may spread to a distance beyond the original point of penetration. Trichomonas lesions of an extensive kind result from the coalescence of necrotic areas.

B. B.

MIXED AND UNCLASSED DYSENTERY.

BARTLETT (G. B.). **Pathology of Dysentery in the Mediterranean Expeditionary Force, 1915.**—*Quart. Jl. of Med.* 1917. Apr. Vol. 10. No. 39. pp. 185–244.

This excellent report must be read *in extenso* to be properly appreciated. It is an efficient document of the pathology of dysentery as it affected our troops in the Mediterranean area in 1915. Some of the post-mortem findings have already been foreshadowed in some of Sir R. Ross's papers. The report also contains some useful practical information about the preservation of pathological specimens and the best way of transmitting them to England from abroad.

E. E. Atkin.

THOMSON (David) & MACKIE (T. J.). **Clinical and Laboratory Researches on Dysentery in Egypt, with some Remarks on Sanitation.** *Jl. Roy. Army Med. Corps.* 1917. Apr. Vol. 28. No. 4. pp. 403–427. With 12 charts.

The first part of this paper does not bring forward any facts that are really new, but the section on sanitation is worth reading in its entirety. The gist of it is contained in the two great reforms which are said to be necessary :—

"(1) The thorough fly-screening of mess-rooms, kitchens, and canteens in all permanent camps and hospitals.

"(2) The removal of camps to some miles distance from insanitary native areas, since owing to lack of sanitary by-laws it is not possible so far to clean up such areas."

The question of insanitary native quarters in Egypt is a very pressing one and until it is remedied dysentery and typhoidal diseases will still be rampant, as this is the chief source of infection. From an economic point of view alone the cleansing of these native haunts would be money well spent on account of the enormous saving it would effect in hospital maintenance, etc. E. E. A.

INMAN (A. C.) & LILLIE (D. G.). **A Contribution to the Study of Dysentery.**—*Lancet.* 1917. Apr. 7. pp. 533–534.

Between November 3rd, 1916, and January 4th, 1917, 159 dysentery convalescents from France were examined. The table shows the number of cases harbouring *E. histolytica* cysts.

Table I.

Number of cases admitted.			Number of amoebic carriers discovered.		
British	Australian.	Other Colonial troops.	British.	Australian.	Other Colonial troops.
134	21	2	13	5	0

The blood of 7 out of the 18 carriers gave a positive agglutination with Flexner or Shiga. This suggested a more extended enquiry and 97 cyst carriers invalided from France or Flanders were similarly tested.

Table II.

Agglutination Tests in the Case of Amoebic Carriers from France.
Number of cases, 97.

Number of cases in which the blood agglutinated B. Flexner ..	26
Number of cases in which the blood agglutinated B. Shiga ..	7
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga	64

Their histories showed that 66 of these cases must have been infected in France, while in 38 a history of contact with infection was elucidated. The next table shows the results of an examination of cases from the Mediterranean area.

Table III

Agglutination Tests in the Case of Amoebic Carriers from the Mediterranean.

Number of cases, 98.

Number of cases in which the blood agglutinated B. Flexner ..	5
Number of cases in which the blood agglutinated B. Shiga ..	28
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga	65

The preponderance of Shiga cases will be noted, whereas in patients from France Flexner cases were in the majority.

The last table shows cases from India, etc., for comparison.

Table IV.

Agglutination Tests in the Case of Amoebic Carriers from India, Mesopotamia, or Egypt.

Number of cases, 35.

Number of cases in which the blood agglutinated B. Flexner	1
Number of cases in which the blood agglutinated B. Shiga..	3
Number of cases in which the blood failed to agglutinate either B. Flexner or B. Shiga..	31 (88·5%)

E. E. A.

CUNNINGHAM (J.) & KING (H. H.). **Dysentery in the Jails of Eastern Bengal. Being the Report of a Special Investigation conducted under the Auspices of the Indian Research Fund Association.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 442–497.

Although there is not much of signal importance as regards dysentery in this article it makes interesting reading from the point of view of jail-hygiene, and should be read in its entirety by those specially interested.

From an analysis of the cases given it would appear that bacillary dysentery is about ten times as frequent as the amoebic variety in the jails of Eastern Bengal.

E. E. A.

LOEHLEIN (R.). **Zur pathologischen Anatomie der Ruhr.** [Pathological Anatomy of Dysentery.]—*Med. Klinik.* 1917. Feb. 11. Vol. 13. No. 6. pp. 153–154.

The sago-like bodies found in dysentery stools have their origin in the mucous cysts of the mucosa, and are not the result of peristaltic movements on the intestinal contents. Naturally enough foreign particles become incorporated in their masses during their passage along the gut, which accounts for the fact that they sometimes give the reaction for starch with iodine.

E. E. A.

LYNCH (Kenneth M.). **Macrophages in Feces in Acute Dysentery**—*Jl. Lab. & Clin. Med.* 1917. Jan. Vol. 2. No. 4. pp. 251–253. With 1 text fig.

A case of acute clinical dysentery in the stools of which a considerable number of round or ovoid cells were found, varying in size from 25–45μ, non-motile, with densely granular cytoplasm, and a large ring-form nucleus. They usually contained red blood cells and polynuclear leucocytes in vacuoles in their protoplasm. None of these large phagocytes were found after the second day, disappearing before the red blood cells and leucocytes from the faeces. They are probably large wandering body cells -the so-called endothelial phagocytes. The case was thought to be bacillary dysentery.

E. E. A.

AMEUILLE (P.) & PÉRIN (L.). **Oesophagite dysentérique,**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 4. 3 Ser. Vol. 32. No. 37–38. pp. 2289–2294.

A report of two cases of what was presumably bacillary dysentery, in which lesions of the oesophagus occurred. They both complained of dysphagia and one of them eventually refused all food, solid and liquid, so great was the discomfort. Both patients succumbed, and in addition to the usual dysenteric lesions, ulceration of the oesophagus was found.

E. E. A.

TOEPFFER (H.). **Zur Behandlung der Ruhr oder ruhrähnlicher Darmerkrankungen.** [Treatment of Dysentery and Similar Intestinal Affections.]—*Münch. Med. Woch.* 1917. Feb. 13. Vol. 64. No. 7 p. 234.

While on the march three cases of clinical dysentery occurred among some troops but circumstances did not permit of any bacteriological examination. They were quickly cured by bismuth and sour milk. The bismuth was given in half gram doses every two hours for six doses. A plate of sour milk (Joghurt) was taken at the hours of 10, 4 and 7. The sour milk was brought to the boil to avoid the danger of contaminated water which might have been added, as it was obtained directly from the peasants in the neighbourhood.

E. E. A.

ROSENHAUPT (Heinrich). **Behandlung der Ruhr mit Kasein.** [Treatment of Dysentery with Casein.]—*Deut. Med. Woch.* 1917. May 31. Vol. 43. No. 22. pp. 683–684.

In the last few years progress has been made in the treatment of dietetic ailments in children by appreciating the fact that the whey of cow's milk is more or less toxic. FINKELSTEIN and MEYER have shown this to be so by blending human casein and cow's whey on the one hand and cow's casein and human whey on the other, the former combination being toxic and the latter not. The author thought of applying this knowledge to the treatment of dysentery, especially in the field. For each patient not more than about a litre of cow's milk is required daily. Rennet is added in the form of the powder, dissolved in water. On gentle warming the casein separates out and is freed from the whey by straining through muslin; 10–20 gm. of sugar are then added to the casein and it is ready to be taken. Experience has shown that excellent results are obtained in dysentery. The peristaltic unrest of the intestines is immediately allayed, while the other symptoms rapidly disappear. In one case where whole cow's milk was given to a convalescent by mistake, frequent and watery stools again made their appearance. Casein purified in this way is to be looked upon not only as a food but also as a specific therapeutic agent.

E. E. A.

ZUELZER (G.). **Die Hormonaltherapie bei Ruhr.** [The Hormonal Treatment of Dysentery.]—*Deut. Med. Woch.* 1917. Jan. 4. Vol. 43. No. 1. pp. 14–15.

The author has already pointed out that acute dysentery should be looked upon as an acute spastic colitis accompanied by constipation, on the grounds that for the first three or four days of the disease only blood and slime and no faecal material are voided. Atropine has been successfully employed to combat the spasms. A small epidemic afforded an opportunity to try the effect of hormonal. This drug changes the spasmodic contractions of the intestine into the normal peristaltic wave. The actual preparation used was neohormonal which lacks the depressant action on the circulatory system possessed by hormonal itself. 20 c.c. of neohormonal were injected intravenously for a dose. This led in some cases to the evacuation, some hours later, of a voluminous stool, sufficient in bulk to fill an ordinary bed-pan. Thus, paradoxical though it may seem, these patients are in reality constipated. All the 40 cases so treated were benefited.

E. E. A.

SCHOLZ (H.). **Atropinbehandlung bei ruhrartigen Erkrankungen.** [Treatment of Dysenteric Conditions with Atropine.]—*Deut. Med. Woch.* 1917. Mar. 22. Vol. 43. No. 12. pp. 364–365.

This is a plea for the administration of atropine in clinical dysentery and similar complaints. Presumably by its action on the vagus, which is almost certainly affected in dysentery, this drug combats the colic, while in many cases the stools rapidly become normal. [See also this *Bulletin*, Vol. 8, p. 452].

E. E. A.

DONALDSON (Robert). **An Easy and Rapid Method of Detecting Protozoal Cysts in Faeces by Means of Wet-Stained Preparations.** —*Lancet.* 1917. Apr. 14. pp. 571–573.

The author finds that a mixture of equal parts of (a) 5 per cent. aqueous solution of KI saturated with iodine to which is added an equal volume of ether, and (b) (1) a saturated aqueous solution of rubin S, or (2) a saturated aqueous solution of eosin, or (3) Stephen's scarlet writing fluid, gives the best results in examining faeces for protozoal cysts.

It is preferable to mix afresh for each day's use the two elements (a and b) of the combination stain. The thinnest possible layer of stain plus faeces should be used, so that all gross particles must be excluded. Eosin alone is in the author's opinion not so good as iodine alone, which is again less useful than the combined stain proposed by him. Details are given of the appearance of cysts and various other bodies found in faeces when this method of staining is used.

B. Blacklock.

PAYAN & RICHET (Charles) fils. **Un cas de dysenterie balantidienne observé en France.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1–2. pp. 96–103.

A Serbian soldier 49 years old was admitted to hospital in Marseilles in January, 1916, suffering from general debility. He had served in the winter of 1915 in Albania. Constipation alternating with diarrhoea, great emaciation, and asthenia were his chief symptoms. *Balantidium coli* was found in the faeces which were first examined on April 5th. The patient died on the 9th of that month. No amoebae, nor cysts of amoebae were present, nor typhoid, paratyphoid, tubercle bacilli nor cholera vibrios; sero-agglutination negative for Hiss, Flexner and Shiga. A few Trichocephalus ova were found, no eosinophilia. A description of the conditions found at autopsy is given in detail. In so far as regards the intestine, the large intestine alone presented ulcerations, and these were chiefly located in the sigmoid flexure, and to a less degree in the ascending colon. In the former situation 16 ulcers were counted of a diameter varying from 5 to 20 mm., while innumerable minute ulcers were present. The large ulcers were as a rule oval in shape, situated transversely to the long axis of the colon, and appeared to reach the submucosa. The microscopical examination of sections showed the ulcers to have characters similar to those produced by amoebae. Balantidium was not found in the sections, but the author observes that the autopsy was not made until 24 hours after death. In conclusion the author discusses previous cases of human balantidiasis and its treatment.

B. B.

ERRATUM.—Vol. 9. No. 8. p. 423—first line of SWELLENGREBEL & SCHIESS summary—for Vol. 2 read Vol. 3.

MALARIA.

SOCIETY OF RUSSIAN PHYSICIANS IN MEMORY OF H. T. PIROGOV. **Work of the Commission for the Study of Malaria in Russia. Vol. 2. No. 4.** [In Russian].—221 pp. With 6 plates. 1915. Moscow: A. H. Mamohtoba.

After an interval of ten years the Malaria Commission in Memory of Pirogov have resumed their reports with an account of two expeditions, undertaken in 1904 and 1905, to the Caucasus. The reports of both expeditions are summarised in French. In the course of the first expedition, to Gagry [Black Sea], 1,857 persons were examined, of whom 27·4 per cent. were actually suffering from malarial fever, and 26·3 per cent. from enlarged spleen, while parasites were found in the blood of other 20·1 per cent. Most of this malaria is believed to be imported. No fatal cases were observed. Among complicated cases those with symptoms of a dysenteric character—yielding to quinine—were often noticed. The prophylactic use of quinine, when regularly and properly carried out, was found to be efficacious. Few mosquitoes—*Anopheles maculipennis* and *bifurcatus* —were found, and the breeding places were such as could be easily dealt with. The infectivity of *A. maculipennis* was confirmed. Among subsidiary observations a case that appeared to be kala azar is recorded.

The second expedition worked in and around Pilenkowo, a village situated in a low plain at the confluence of four mountain streams. This was found to be a hot-bed of malaria, and at Pilenkowo itself the only inhabitants free from malaria (or a malarial history) were the new-born infants and the recent arrivals. Blood examinations for parasites revealed (double infections separately included) *P. vivax*, 42·4 per cent.; *P. malariae*, 37·1 per cent.; *P. falciparum*, 36·7 per cent. The fever-curve showed two maxima, one at the beginning of spring, caused chiefly by relapses of quartan infections, and the other in August due to new infections of all three forms of the parasites. The highest percentage of cases was among children from 1 to 9 years old; from 39 years onwards the predisposition to infection appeared to decrease gradually. Russians seemed to be less disposed to infection than Moldavians and natives of Little Russia. It was observed that the growth of malarious children was retarded and the weight below standard. Quinine as a prophylactic was found to be of very little use. *Anopheles maculipennis* and *bifurcatus* were both very numerous. Among subsidiary observations the abundance of Culicines, and the natural infection of one specimen with a Filaria of an undetermined species are recorded.

A. Alcock.

MARZINOVSKI (E. I.). **The Fight against Malaria and Public Organisation (for the Purpose).** [In Russian].—The Pirogov Malaria Commission.—19 pp. With 3 plates. 1916. Moscow: A. H. Mamohtoba.

The Pirogov Commission have also published an anti-malarial pamphlet of an educational kind, and four sanitary broadsides one of which deals with *Anopheles maculipennis*. All these are in unmitigated Russian, but if the text is as effective as are the illustrations it is above criticism. The figures in the anti-malarial pamphlet include comparisons of Anopheles and Culex in different phases, door-screens, a mosquito-net as it should not be used, a good series of the natural enemies of mosquitoes and mosquito larvae, and a likely Anopheles breeding pond.

A. A.

MITZMAIN (M. Bruin). **Is Mosquito or Man the Winter Carrier of Malaria Organisms?**—*U.S. Public Health Serv. Pub. Health. Bull.* No. 84. 1916. Dec. 32 pp. With 19 figs.

This paper records an effort, continued from February to June, 1915, to ascertain, by careful observation in a definite area of the Mississippi Delta having a high malaria index, all the relevant facts concerning the hibernation of Anopheline mosquitoes, and also whether hibernating anophelines harboured any form of the malaria parasite and reacted in any significant way to experimental variations in temperature.

Mosquitoes were found only under houses and in the depths of woods; no males were observed; no eggs, larvae, or pupae could be discovered. In the laboratory eggs were laid at temperatures between 13·5° C. and 16·7° C., but not at temperatures below 12·5° C. Such eggs did not hatch except at temperatures above 16° C.—the best temperatures being between 19° C. and 21° C. 1,211 hibernating anophelines were examined for malaria parasites prior to May 15th without any positive result.

On the other hand, of 1,184 human beings whose blood was examined between February and March, 1915, nearly 25 per cent. harboured gametocytes. The author therefore concludes that in the area investigated man is the sole winter carrier of malaria.

Some observations were also made in January, 1916, in Alabama. Hibernating anophelines were found chiefly in cattle-sheds, stables, outhouses and privies, and under buildings; 371 specimens were collected and were examined for malaria parasites without any positive result.

A. A.

TAIWAN IGAKKAI ZASSI. 1916. Sept. 28. No. 167. pp. 803–808. **Mosquitoes and Malaria in Formosa.** [Review by R. G. MILLS in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. pp. 167–168].

The Anopheles observed in Formosa were *A. sinensis*, *A. maculatus*, *A. willmori*, *A. listoni* and *A.* "*taito*." All three species of malaria parasites were observed in patients' blood.

A. A.

NETTER. **Observations à l'occasion du procès-verbal. Sur le danger du paludisme en France.**—*Bull. Acad. Med.* 1917. May 29. 3 Ser. Vol. 77. Year 81. No. 22. pp. 686–690.

The speaker here reported, being of opinion that human beings who have been infected with malaria, and Anopheles mosquitoes, are not the only factors in the dissemination of malaria, is apprehensive lest the public anxiety respecting the recrudescence of malaria in France, through the medium of returned convalescents from the army, may be disadvantageous to the convalescents.

In the subsequent discussion M. BLANCHARD showed how the arguments that appeared to countenance the view that there are other factors besides Anopheles mosquitoes and infected human beings could be refuted; he also availed himself of the opportunity to denounce the German usurpation of the credit of having originated the specific anti-parasitic treatment of diseases due to protozoa.

A. A.

GARIN (Ch.). **Sur la genèse du paludisme.**—*Presse Med.* 1917. June 4. Vol. 25. No. 31. pp. 319–321.

The author criticises the text-book proposition that "an individual bitten by an Anopheles infected with malaria manifests the symptoms of malarial fever after an interval of 10 to 15 days," and from his experience in Macedonia produces evidence -including evidence derived from examination of the blood—that individuals may become infected with malaria and may remain apparently healthy for an indefinite period, until, perhaps, some extraneous event determines an attack of fever. Such individuals must possess a partial and variable degree of immunity, partly natural, partly acquired by the use of quinine as a preventive. Among the exciting causes which may bring about an attack of malarial fever in an individual infected with malaria parasites, but apparently healthy and having a history and antecedents perfectly clear of malaria, are muscular fatigue, unusual exposure to the sun, wounds, surgical operations, and chloroform anaesthesia, and also antityphoid inoculations.

A. A.

ARMAND-DELILLE (P.), PAISSEAU (G.) & LEMAIRE (H.). **Note sur les constatations positives d'hématozoaires au laboratoire de bactériologie de l'armée d'Orient pendant l'année 1916.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 284–287. With 2 charts.

Monthly returns of the incidence of *P. falciparum* and *P. vivax* represented graphically. The diagrams show for *P. falciparum* a blank for the five months February to June, and an abrupt and very conspicuous ascent in October; and for *P. vivax* a low level throughout the year except in July and August, the July ascent being also extremely abrupt and conspicuous.

A. A.

MACFIE (J. W. S.) & INGRAM (A.). **Observations on Malaria in the Gold Coast Colony, West Africa.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 1–26. With 2 plates.

This paper is based mainly on observations and investigations made during the last few years at the laboratory at Accra. The authors are of opinion that the unhealthy reputation of the Gold Coast is largely due to malaria. In both European and native patients subtertian parasites are by far the commonest, and a peculiarity of the local subtertian infections is the rarity of both crescents and schizonts—the uncommonness of crescents having been remarked by almost all observers in West Africa. Though subtertian malaria persists through the year, most of the cases occur during the third quarter, the maximum incidence being in August about two months after the acme of the rain-curve. The normal ring form in local subtertian infections is frequently departed from, the commonest abnormality being a form containing several masses of chromatin; but in a few cases forms without chromatin have been noticed. In more than 20 per cent. of cases forms regarded as identical with STEPHENS' *P. tenue* have been found, and in four cases there have occurred forms resembling another of STEPHENS' varieties—namely forms characterized by "chromatin particles or strands without any protoplasm"; these two varieties have been observed particularly in young native children with a much enlarged spleen and other evidence of grave infection and in adults who were anaemic and debilitated. Several cases, chiefly of quartan infection, associated with oedema resembling that of acute nephritis have been observed in children. Anaplasma-like bodies have been found frequently in human blood at Accra, and the authors incline towards the opinion that they may be malaria parasites that have undergone degeneration through the action of quinine.

A. A.

i. VON DRAGA (Ludwig Thaller E.). **Die experimentelle Aktivierung latenter Malariafälle.** [The Experimental Activation of Latent Malaria.]—*Wien. Klin. Woch.* 1917. Jan. 25. Vol. 30. No. 4. pp. 102-105. With 10 charts.

ii. BRAUER (Gregor). **Ueber Mobilisierung von Malaria-Parasiten im Blute.**—*Ibid.* pp. 105–107.

1. The author describes his experiments in reviving latent malaria by injections of sterilized milk. Thirty cases are recorded, some of which had had benign tertian. The dose of sterilized milk was 5 c.c. In 5 cases there was no reaction; in 13 there was an immediate rise of temperature; in 12 this initial rise of temperature was followed, after an interval of 10–14 days, by fever and the appearance of malaria parasites in the blood. In 3 cases parasites were found apart from the specific "milk-injection fever."

ii. This author, experimenting at Skutari, Albania, with injections of normal horse-serum in the treatment of tropical malaria, found that its immediate effect was to increase the number of schizonts or gametocytes; and that in patients whose blood was free from parasites at the time of the injection, its ultimate effect was to resuscitate the parasites. Subcutaneous "mobilising" injections of horse-serum were therefore made with the object of discovering the existence of latent malaria; and also for therapeutic treatment, the injection of horse-serum being followed in four hours by an intravenous injection of quinine. Milk, which was tried to meet demurs to the sterility of horse-serum, was found to be not so successful. The suitability of such tests is suggested for recovered malaria patients wishing to enter a clean area where Anopheles exists.

A. G. B.

Paisseau (G.) & Lemaire (H.). La cachexie aigue du paludisme primaire.—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1916. Dec. 21. 3 Ser. Vol. 32. No. 35–36. pp. 2204–2236. With 3 figs.

Among primary malarial infections in Macedonia the authors have encountered numerous cases of insidious and aggravated pernicious anaemia, usually ending fatally, characterised by suddenly-developed oedema in legs or scrotum or face (without albuminuria or evidence of heart trouble) and by digestive derangements and diarrhoea. They are in fact cases of masked malaria which have not—or not sufficiently—been treated with quinine.

Several such cases are presented by the authors in great detail - clinical, clinico-pathological, and post-mortem-pathological.

The tissues and organs—apart from the blood, which is deficient in both red and white cells—most deeply affected are the bone-marrow, the supra-renal capsules, and the liver; but there are also notable changes in the spleen and small intestine. In the bone-marrow the nucleated red-cells and true myelocytes are rare; almost all the cellular elements found are promyelocytes, showing that regeneration is imperfect. The supra-renal capsules are profoundly altered: they are indurated, sclerosed and degenerated, their cellular elements are atrophied and deficient, and thrombi and patches of necrosis occur. The cellular elements of the liver are degenerated and atrophied. The spleen is enlarged and diffluent; its lymphoid tracts are atrophied, and its pulp is congested and infiltrated with macrophages. The mucosa of the small intestine is congested and ecchymosed, its epithelium being stunted, the submucosa is oedematous, and there may even be actual ulceration; Peyer's patches are not affected. There may be degeneration of the renal epithelium.

The authors attribute these cases of cachectic anaemia in the first instance to lesions of the bone-marrow in which *Plasmodium falciparum* has taken refuge, and to degeneration and the suppression of function of the supra-renal capsules. That the malaria-parasite has established itself in the bone-marrow is probably due to the infection having been masked (larval malaria), and so not treated with quinine to begin with. In such obscure cases, furthermore, the infected person is likely to continue at work and so to become further debilitated.

As regards treatment, in malarious conditions malaise and obscure symptoms should be as vigilantly attended to as cases of typical malaria. When the cachexia of primary malaria is established adrenalin and organic compounds of arsenic should be associated with quinine: but it is essential that the patient be removed from all risk of re-infection in the malarious area.

A. A.

Falconer (A. W.) & Anderson (A. G.). Clinical Types of Subtertian Malaria as seen in Salonika in September, October, and November, 1916.—*Lancet.* 1917. Apr. 21. pp. 607–610.

The authors observed 3,600 cases of malaria in base hospitals. In 40 per cent. of them parasites were not detected in the blood films, but practically all the patients had been treated with quinine before reaching the base. Thirty cases died, but in 8 malaria was not the

actual cause of death, and in 5 others non-malarial complications were co-existent. Thus 17 cases of uncomplicated malaria were fatal, a percentage of 0·47.

Many of the cases had a dysenteric cast, quite apart from any other infection than malaria. Two -both fatal—were of the pernicious choleraic type, with profound collapse. In 12 the symptoms suggested appendicitis. There were a good many cases of the bilious remittent kind, with vomiting, diarrhoea, jaundice, hiccough, and collapse; 13 such were fatal. In some cases the symptoms were almost purely bronchitic, pneumonic, or broncho-pneumonic. There were a few cases of the cerebral type, with epileptiform symptoms, local paralysis, or violent delirium suggesting meningitis. There were 2 cases of generalised oedema, and 3 cases of localised gangrene of the feet.

As regards the specific infection, the majority of the cases observed were benign tertian, double tertian, and subtertian.

A. A.

i. LENZ (F.). **Beobachtungen über Malaria in malariafreier Gegend.** [Observations on Malaria in a Malaria-Free District.]—*Münch. Med. Woch.* 1917. Mar. 20. Vol. 64. No. 12. pp. 394–396. With 2 charts.

ii. MUEHLENS; LENZ (Fritz). **Beobachtungen über Malaria in malariafreier Gegend. Bemerkungen zu F. Lenz, d. Wochenschr. 1917 Nr. 12. Erwiderung auf die Bemerkungen von Prof. Mühlens.**—*Ibid.* June 19. No. 25. pp. 829–830.

i. A ponderous piece of speculation evoked by 80 cases of malaria at Puchheim. The following conclusions are considered by the author to be worthy of emphasis:

The curve of malaria-relapses, like that of new infections, follows the summer temperature and the duration of sunshine.

The susceptibility to relapse through raised external temperature reveals a natural and selective adaptation of the malaria-excitant to the flight-time of Anopheles.

Relapses have the same incubation period as new infections.

ii The author, without wishing to deal with Lenz's chimerical theory of malarial relapses, invites attention to certain established matters of fact that are inconsistent with Lenz's assumptions.

Prof. Lenz, after copious justificatory argument, replies that perhaps he has not ignored matters of ratified experience so much as his critic appears to think, the main object of his venture into theory being not to add to the literature of malaria but to discover determining factors in organic natural selection.

A. A.

DUERCK (Hermann). **Ueber die bei Malaria perniciosa comatosa auftretenden Veränderungen des Zentralnervensystems.** [Changes in the Central Nervous System in Pernicious Malaria with Coma.] —*Arch. f. Schiffs- u. Trop. Hyg.* 1917. Apr. Vol. 21. No. 7. pp. 117–132.

The author has seen many cases of pernicious malaria with sudden fatal coma or with clinical symptoms referable to the central nervous system.

The macroscopic appearances of the brain were not uniform; they include signs of purulent leptomeningitis, dark discolouration of the cortex, punctiform haemorrhages, "brain-purpura," and larger extravasations into the brain substance.

The microscopic changes include mechanical obstruction of the vessels and damage to and desquamation of their epithelium, due to the accumulation of malaria parasites and their degeneration products; and various other changes of an inflammatory nature due to specific intoxication. Among the latter changes the author mentions infiltration of the meninges, the neuroglia, and the vessel-sheaths, perivascular proliferation leading to pressure upon and shrinkage of the ganglion-cells, which may go on to the formation of circumscribed nodules—"malaria-granuloma," or "malaria-tubercle". the precursory stages of multiple scleroses.

A. A.

RUSSELL (Frederick F.). **Relapses in Malaria.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. Jan.–June. Vol. 9. Pt. 1. pp. 25–30.

This paper deals with the malaria records of an infantry regiment stationed in the Canal Zone. In 4¼ years, from October, 1911, to December, 1915, there were 718 cases—presumably fresh infections, as the regiment had come from a part of Texas free from malaria. The standard treatment was 30 gr. of quinine daily, by the mouth, during stay in hospital and for a month after return to duty. In 186 cases (25 per cent.) relapses occurred. Of the 186 relapsing cases 47·8 per cent. were ascertained to be tertian, 45·2 per cent. subtertian, and 0·6 per cent. quartan: in 116 cases the number of relapses was 1, in 40 cases 2, in 18 cases 3, in 9 cases 4, and in 3 cases 5. Of the 186 cases 48 (25 per cent.) relapsed within the term of treatment, i.e., while the patient was taking 30 gr. of quinine daily: it is possible that in some of these cases the men may have avoided the dose, but the author convinced himself that relapses did actually occur in patients who were swallowing their quinine in a liquid form regularly. From experiments with intermittent quinine the author repudiates the quinine-fast theory, and favours the explanation that in these refractory cases the quinine solution was not properly absorbed, since the combination of stimulative adjuvants—iron and strychnine, or capsicum and ginger—with the quinine stopped relapses.

A. A.

BIEDL (Artur). **Studien über Malaria.**—*Wien. Klin. Woch.* 1917. Apr. 5, 12, 19. Vol. 30. Nos. 14, 15, 16. pp. 419–426, 459–465, 497–505.

These rather prolix papers deal with the various forms of the malaria parasite as examined by dark ground illumination, the author's opinion being that both for the study of the behaviour of the parasite as a living organism and as influenced by drugs, and also for the mere practical detection of the parasite, this method is far superior to all others.

A. A.

DEADERICK (William H.), **Some Aspects of Malaria in Children.**—*Interstate Med. Jl.* 1917. June. Vol. 24. No. 6. pp. 545–546.

In the author's experience children are oftener and more severely affected with malaria than adults: they are prone to pernicious attacks, especially of the cerebral type: the first stage of the fever is rarely typical: the rise of temperature in the second stage is higher than in adults: enlargement of the spleen is more constant. In the treatment of children it is best to give quinine every 2 or 3 hours, in doses of ½ to 1 grain up to 2 years of age, 1 to 2 gr. from 3 to 5 years, 2 to 2½ gr. from 6 to 10 years. Euquinine and tannate of quinine are the best tasteless preparations, but must be given in larger doses. The best disguise for sulphate of quinine is syrup of yerba santa, 1 drachm for each gr. 2 of quinine. Inunctions of quinine and lard, and of quinine and glycerine, are used in some parts.

A. A.

MOREIRA (A. A. Santos). **Infantilismo palustre.** [Malarial Infantilism.] *Arch. Brasileiros de Med.* 1916. Nov.-Dec. Vol. 6. No. 11–12. pp. 657–693. With 17 figs.

A paper drawing attention to the arrest of development in young children occasioned by malarial cachexia. The author measures its amount by comparing the actual dimensions of the affected child with those which are standard for its age, according to the following scheme.

Case: female child, aged 6 years. Height in centimetres, 90·5 cm.; normal for the age, 107 cm. Circumference of head. 47 cm.; normal for the age, 50·3 cm. Thoracic girth, 45 cm.; normal, 53·5 cm. Weight, 11·4 kilos; normal, 17·5 kilos. Length of head, one-fifth that of the body, instead of one-sixth [cf. the author's table, fig. 11]. Ossification of bones of the hand, as shown by radiogram, three bony centres only in the carpus, being the normal for 3 to 4 years of age.

In this way, the injury to growth occasioned by chronic malarial cachexia can be very strikingly demonstrated, and a similar procedure can be adopted for cases of uncinariasis. It does not appear, however, from what the author says, that there is any special type of infantilism characteristic of malarial cachexia.

J. B. Nias.

HERMS (William B.). **A State-Wide Malaria-Mosquito Survey of California.**—*Jl. Econom. Entomol.* 1917. June. Vol. 10. No. 3. pp. 359–370.

According to W. F. SNOW in 1909 the ratio of deaths from malaria was higher in California than in any other of the 18 States included in the registration area.

In 1916 a systematic mosquito survey was sanctioned by the State Health Authority, at an estimated cost for the season of 2,150 dollars exclusive of any charge for the services of the director and his assistants The estimates provided, besides travelling-expenses, abundant maps, collecting outfit, microscope, camera, and a large motor-car. The field work for the season occupied 89 days, and the distance travelled was about 7,000 miles, from the sea-level to a height of about 8,000 feet. Adult mosquitoes were tracked to their hiding-places (commonly under bridges, in culverts and in outhouses) and systematically collected. Breeding-places where located, described, and photographed. Local officials were instructed in the field. Local physicians were consulted for blood-smears. Public lectures illustrated from the locality were frequently given. Broadsides on " Malaria and Mosquito Control " were freely distributed.

The Anophelines collected are being mounted for reference, and a card-index of localities is being prepared, so that ultimately every species occurring in the State and all particulars relevant to each will be on record.

A. A.

EUGLING (Max). **Ueber Malaria und ihre Verhütung.** [Malaria and its Prevention.]—*Wien. Klin. Woch.* 1917. Jan. 18. Vol. 30. No. 3. pp. 65–68.

Much of this paper is of an elementary admonitory kind. The author also gives some account of symptoms of the malaria observed in Albania, distinguishing comatose, typhoid, cholera-like, and dysenteric forms. The onset of the tropical form was so sudden that the first cases were reported as heat-stroke.

A. G. B.

MALLOIZEL. **Le paludisme d'Orient peut se contracter en France. Un cas de malaria à parasites crescentiformes contractée à Vannes.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917 Feb. 8. 3 Ser. Vol. 33. No. 3–4. pp. 168–174. With 2 charts.

An account, in very particular detail, of a case of subtertian malaria contracted by a man who had never been out of France. The man was an in-patient under treatment for dysentery in the hospital at Vannes, where Anopheles exists, and in neighbouring beds there were at least six cases of severe malarial fever sent home from Salonica. The author points the obvious moral that returned malaria patients should be segregated and protected from the attacks of mosquitoes.

A. A.

TURNER (G. Grey). **Spontaneous Rupture of the Spleen. With an Account of a Case due to Malaria and One of Necrotic Infarct with Intraperitoneal Haemorrhage simulating Spontaneous Rupture.**—*Lancet.* 1917. May 26. pp 799–801.

An account of two cases from Mesopotamia. In the first case the patient's symptoms were those of fatal malaria of the cerebral type: there was no acute attack of abdominal pain and nothing to suggest any peritoneal lesion; post mortem the spleen was twice the normal size and showed two small lacerations, each about a quarter of an inch long, on the outer surface near the upper end. In the second case the patient had been very ill for five weeks with fever that had been regarded as of the enteric genus with a supervening malarial complication; an attack of abdominal pain and vomiting suggested probable rupture of a typhoid ulcer; post mortem the spleen was very friable and exhibited two necrosed and almost separated infarcts the beds of which were advanced towards repair.

A. A.

STEUDEL. **Verlauf endemischer Malaria nach Entfernung der Parasitenträger.** [Course of Endemic Malaria after Removal of Carriers.] —*Arch. f. Schiffs- u. Trop.- Hyg.* 1917. Jan. Vol. 21. No. 2. pp. 21–29. With 1 chart.

The venue is given vaguely as "the East." All admissions for malaria or suspected malaria were immediately put under mosquito-nets. As soon as thick blood-smears had been made for subsequent examination in the laboratory, the case was treated with quinine and sent away to a hospital in a locality free from malaria. In this malaria-hospital the cases were treated with quinine. A few cases of cinchonism were observed--three of erythema with very troublesome itching, one of general tremor. The commonest complications of malaria were catarrhal pneumonia and dry pleurisy. Heart-complications sometimes occurred, but it is doubtful whether they were originated, or exacerbated, by the malaria or by the quinine.

A. A.

CARLILL (Hildred). **Korsakow's Psychosis in Association with Malaria.** —*Lancet.* 1917. Apr. 28. pp. 648–650.

Korsakow's psychosis usually occurs in alcoholics suffering from peripheral neuritis; its characteristics are said to be confusion of thought, loss of memory for recent events. and difficulty in concentrating the attention.

The prominent feature of the case here recorded was a bland mental incoherence due to long antecedent occurrences being concatenated and confused with recent states of consciousness. Along with this there was absence of the ankle-jerks. The patient was weak and anaemic and had traces of gout. The viscera and the urine were normal. The Wassermann reaction was negative. There was no history- and no suspicion of alcoholism. There was a history of "intermittent fever," and of admission to hospital in Alexandria for extensive oedema of the lower extremities. While under observation recently the patient had an access of fever and malaria-rings were found in the blood.

A. A.

ABRAMI (P.). **Le paludisme primaire en Macédoine et son traitement.** —*Presse Med.* 1917. Mar. 22. Vol. 25. No. 17. pp. 161–164.

Eighty-five per cent. of the malarial fevers of Macedonia are due to infection with *P. falciparum.* The author has followed 1,980 cases between June, 1916, and January, 1917. The aim of treatment, in dealing with primary infections, is to get the patient as soon as possible and forestall the formation of crescents. This can be brought about only by large doses of quinine 3 grammes daily until the temperature falls. The best method of administration is subcutaneous injection, using the chlorohydrate in combination with urethane and in association with adrenalin. This abortive or sterilizing treatment was successful in 66 per cent. of the author's cases.

When crescents have formed and the infection has become chronic quinine should be continued at least 2 grammes daily by subcutaneous injection—only during the febrile attacks, and during the under bridges, in culverts and in outhouses) and systematically collected. Breeding-places where located, described, and photographed. Local officials were instructed in the field. Local physicians were consulted for blood-smears. Public lectures illustrated from the locality were frequently given. Broadsides on "Malaria and Mosquito Control" were freely distributed.

The Anophelines collected are being mounted for reference, and a card-index of localities is being prepared, so that ultimately every species occurring in the State and all particulars relevant to each will be on record.

A. A.

EUGLING (Max). **Ueber Malaria und ihre Verhütung.** [Malaria and its Prevention.]—*Wien. Klin. Woch.* 1917. Jan. 18. Vol. 30. No. 3. pp. 65–68.

Much of this paper is of an elementary admonitory kind. The author also gives some account of symptoms of the malaria observed in Albania, distinguishing comatose, typhoid, cholera-like, and dysenteric forms. The onset of the tropical form was so sudden that the first cases were reported as heat-stroke.

A. G. B.

MALLOIZEL. **Le paludisme d'Orient peut se contracter en France. Un cas de malaria à parasites crescentiformes contractée à Vannes.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917 Feb. 8. 3 Ser. Vol. 33. No. 3–4. pp. 168–174. With 2 charts.

An account, in very particular detail, of a case of subtertian malaria contracted by a man who had never been out of France. The man was an in-patient under treatment for dysentery in the hospital at Vannes, where Anopheles exists, and in neighbouring beds there were at least six cases of severe malarial fever sent home from Salonica. The author points the obvious moral that returned malaria patients should be segregated and protected from the attacks of mosquitoes.

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When crescents have formed and the infection has become chronic quinine should be continued at least 2 grammes daily by subcutaneous injection—only during the febrile attacks, and during the remissions the patient should be kept absolutely at rest, on a nourishing diet, and be treated with arsenic and iron, without quinine; but such treatment is only palliative so long as the patient still remains in the malarious country— for recovery repatriation is necessary.

A. A.

GUTMANN (R. A.). **Étude sur le paludisme du point de vue thérapeutique.**—*Presse Med.* 1917. May 10. Vol. 25. No. 26. pp. 267–270. With 4 charts.

The opinions sustained in this essay are that quinine-resistant malaria parasites *are not*; that small doses of quinine are useless or even harmful; that two grams of quinine daily, in two doses, three consecutive days a week, are *minimum* doses in a case of simple malaria; that treatment should be continued for weeks if the parasites are to be destroyed; and that cases of malaria cured from the clinical standpoint should undergo renewed courses of treatment for some years afterwards.

A. A.

MICHAEL (W. H.). **Quinin and Malaria.**—*U. S. Nav. Med. Bull.* 1917. Apr. Vol. 11. No. 2. pp. 150–156.

In this paper the author, from a "somewhat extensive tropical experience," confirms the opinion that the proper treatment of malarial fever is the administration of quinine in concentration lethal for the parasite, and the maintenance of that concentration until the disease is cured. The author's M.L.D. for the malaria parasite is 15 grains three times a day until the patient's temperature is normal, followed by 10 grains three times a day for three weeks of normal temperature.

A. A.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.) & COOPER (C. Forster). **Studies in the Treatment of Malaria. II. Intramuscular Injections of Quinine Bihydrochloride in Simple Tertian Malaria.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 113–125. With 20 charts.

After brief consideration of adverse opinions and after defining very precisely the limits of their inquiry, the authors give a detailed statement in graphic and tabulated form of the results observed in a series of 20 cases of simple tertian malaria treated with intramuscular injections of quinine. They formally conclude that an intramuscular injection of 15 grains of quinine bihydrochloride in 2 c.c. of water on each of two consecutive days causes the cessation of febrile paroxysms of simple tertian malaria and effects the disappearance of all stages of that parasite from the cutaneous blood: but the action is only temporary, a relapse occurring within two or three weeks. They state that the pain following the specified injection is practically negligible.

A. A.

MINARIK (K.) & SCHOPPER (K. J.). **Zur Therapie der tropischen Malaria.**—*Wien. Klin. Woch.* 1917. Apr. 5. Vol. 30. No. 14. pp. 426–432.

To ensure a constant supply of quinine to the blood the authors devised subcutaneous "depots" of the drug—injections, in doses of 2·5 gm., of a 50 per cent. solution of quinine sulphate in equal parts of glycerine and salt solution. Necrosis of the skin never occurred. The results of 176 cases of tropical malaria so treated in Albania are tabulated; they seem to have been fairly good, but the observations were not continued beyond 28 days, except in one case. From observation of the parasites the authors conclude that the injection should be repeated in 36–48 hours.

A. G. B.

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i. BARBARY (Fernand). **Essais de stérilisation de l'organisme impaludé par le sérum physiologique quininé en injections intraveineuses.**—*Bull. Acad. Med.* 1917. May 1. 3 Ser. Vol. 77. Year 81. No. 18. pp. 570–573.

ii. HAYEM (Georges). **Sur le travail de M. le Dr. F. Barbary, intitulé: Essai de stérilisation de l'organisme impaludé par le sérum quininé en injections intraveineuses.**—*Ibid.* May 15. No. 20. pp. 635–642.

i. A strong affirmation of the efficacy of intravenous injections of quinine-physiological-serum in the treatment of malaria—0·5 gm. of basic hydrochlorate of quinine and 1 gm. of urethane in 125 gm. of physiological serum. An injection is given every three days for the first fortnight, and then every five days.

ii. A review and critical appreciation of the method of administering quinine advocated by Dr. BARBARY. After realising and forestalling the dangers of intravenous injections, and touching upon the deficiencies of other methods, the general history of intravenous treatment is outlined, and the good results obtained by Dr. BARBARY are attested, attention being directed at the same time to the adjuvant influence of arsenic suggested by Dr. Armand GAUTIER (see below).

A. A.

MCLEAN (A. D.). **The Intravenous Administration of Concentrated Solutions of Soluble Quinin in Malaria and Hemoglobinuric Fever.**—*U. S. Nav. Med. Bull.* 1917. Apr. Vol. 11. No. 2. pp. 135–141.

From an experience of about 400 cases so treated, six of which were blackwater fever, the author is convinced that the intravenous injection of concentrated solutions of quinine—1 grain of quinine to 1 mil of sterilized water, and a dose of 10 to 15 mils*— is superior to all other methods of treatment of malarial infections. Immediately after the injection there is a slight irritation in the throat and chest, and a general feeling of heat, followed by passing dizziness and perhaps "a very mild transient syncopal attack," but no really untoward results, either local or general, were observed. Most cases received two injections daily for four or five days, and then one daily for the next ten days. After the third day no rise of temperature occurred, and there was not a single relapse although many of the cases were under observation for nearly two months.

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* Mil. or millilitre = c.c.

A. A.

KURZ (J.) & ERDÉLYI (P.). **Beitrag zur Behandlung der Malaria mit intravenösen Chinininjektionen.** [Treatment of Malaria by Intravenous Quinine.]—*Wien. Klin. Woch.* 1917. Jan. 25. Vol. 30. No. 4. pp. 107–109. With 1 chart.

The authors do not consider intravenous injection superior to other methods of administering quinine, except in cases where rapid action is necessary to save life. Their experience is drawn from 62 cases in a military hospital at Pola, but they do not give specific details. Several cases of nephritis were attributed to malaria.

A. G. B.

JEANSELME (E.) & MANAUD (A.). **Technique des injections intraveineuses de quinine. Faut-il substituer le bichlorhydrate au chlorhydrate basique?**—*Presse Med.* 1917. May 31. Vol. 25. No. 30. pp. 305–306.

The authors say that quinine salts are not well tolerated by the venous walls because of their causticity, and that the basic hydrochlorate of quinine—the salt supplied by the Health Department—produces venous indurations even in a strength of 1/50. Examples are given. These indurations must be prevented by dilution of the salt and by injecting very slowly and uniformly, so that the solution becomes well diluted by the blood. For this reason they use a serum ampoule, rather than a syringe, and admit the fluid by gravity and not by working a piston. The apparatus is described and the method of preparing and injecting the solution, which is of a strength of 1 per cent. and usually of a volume of 100 c.c.; the time taken is 15 minutes. With the last precaution a gramme or a gramme and a half may be given without unpleasant symptoms. The authors are accustomed to inject 10 patients at once; when the needle is being put in place for the last patient the injection of the first is just finished. If however the bihydrochlorate is used, in 1 per cent. concentration, venous induration is rare. Experiments with citrated blood plasma *in vitro* showed this to be the more stable salt.

A. G. B.

GAUTIER (Armand). **Sur le traitement de l'impaludisme par l'association de l'arsenic organométallique à la quinine.**—*Bull. Acad. Med.* 1917. Apr. 24. 3 Ser. Vol. 77 Year 81. No. 17. pp. 544–548.

The author in re-affirming the efficacy of organic compounds of arsenic in the treatment of malarial fevers, which he vindicated 15 years ago, now advocates the use of these compounds in confederacy with quinine. He avouches that injections of 0·5 gm. of hydrochlorate of quinine in association with injections of 5 to 10 cgm. of dimethylarsenate of soda (arrhenal) cure the most obstinate cases of malarial fever, and he explains that the function of the arsenical salt is to intensify and prolong the specific activity of the quinine, after the manner of an adjuvant, or—as appears from the subsequent discussion—of a fixative.

A. A.

DUNLEY-OWEN (A.). **A Note on the Use of Arsenic in the Treatment of Subtertian Malaria.**—*S. African Med. Rec.* 1917. Apr. 28. Vol. 15. No. 8. p. 120.

The writer has used arsenic along with quinine in 50 cases of subtertian malaria, with good results—only two relapses [period of observation not stated]. He gives daily 1 gr. soamin by intramuscular injection for six days and 40 gr. quinine by the mouth for a fortnight, afterwards continuing with 30 gr. quinine daily.

A. A.

SILATSCHEK (Karl) & FALTA (Karl). **Ueber Neosalvarsan und intravenöse Chininbehandlung der chronischen Malaria.** [Neosalvarsan and Intravenous Quinine in Chronic Malaria.]—*Münch. Med. Woch.* 1917. Jan. 16. Vol. 64. No. 3. pp. 93–94.

The authors have treated over 800 cases originally diagnosed as malaria or suspected-malaria, and over 100 of them with injections of neosalvarsan. They come to the conclusion that in chronic malaria neosalvarsan is of very little use and is inferior to intravenous injections of bihydrochloride of quinine. With either method of treatment a prolonged course of quinine by the mouth is advisable.

A. A.

MOREAU (Laurent). **Le novarsénobenzol dans le traitement des manifestations graves du paludisme.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Feb. 8. 3 Ser. Vol. 33. No. 3–4. pp. 210–214. With 1 chart.

Two grave cases were treated with intravenous injections of 15 cgm. of novarsenobenzol along with injections of 1·20 gm. of quinine urethane, and the authors state that although the arsenical salt by itself was not completely efficacious, its association with quinine was followed in one case by disappearance, in the other case by notable diminution, of the malaria parasites.

A. A.

CASTELLANI (Aldo). **Le traitement mixte quinine-phosphore-tartre émétique dans quelques formes rebelles de malaria.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 287–291.

In rebellious cases of malaria, which are not rare in the Balkans, the author has found phosphorus and tartar emetic to be useful adjuvants to quinine. He gives quinine and tartar emetic, in solution, by the mouth, three to six times daily; and also an injection daily, the injection being alternately, quinine (intramuscular) and oil of phosphorus (subcutaneous).

A. A.

STEPHENS (J. W. W.), YORKE (W.), BLACKLOCK (B.), MACFIE (J. W. S.) & COOPER (C. Forster). **Studies in the Treatment of Malaria.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 91–111. With 22 charts.

After drawing attention to some ambiguous assumptions and erroneous statements that occur in Sir Leonard ROGERS' note on the employment of tartar emetic in the treatment of malaria [see this *Bulletin*, Vol. 9, p. 306], the authors give a scrutinous graphic representation, with critical commentary, of a series of 22 cases—11 simple tertian, 10 malignant tertian, 1 double infection—in which the drug was administered, and its effect observed and calculated, with all the precision of a scientific experiment. Such a rigorously formulated statement cannot be condensed, and it must be sufficient to state the authors' conclusions, which are (1) that intravenous injections of tartar emetic do not cause the disappearance from the peripheral blood of any stage of the malaria parasites, whether *P. vivax* or *P. falciparum*, and (2) that these injections do not control either the rigors or the fever of acute malaria.

A. A.

BRODRIBB (C.). **Intravenous Tartar Emetic in Crescentic Malaria.** [Correspondence].—*Indian Med. Gaz.* 1917. June. Vol. 52. No. 6. p. 218.

This does not profess to be an investigation by the canonical experimental methods: it is a mere statement, in circumstantial detail, of an observation that in a hospital patient suffering from subtertian malaria, who was treated finally with tartar emetic, crescents gradually disappeared from the blood. The patient was admitted with a history of 12 days' fever and dysentery, and many crescents were found in his blood. He was treated for the dysentery, and for the malaria he received 30 grains of residual cinchona alkaloids daily for five days. At the end of this time the number of crescents counted in 100 fields was 400; and at the end of the week, when the treatment with tartar emetic was decided on, it was 320. A week after the first dose of 4 c.c. of a 2 per cent. solution of tartar emetic the number of crescents counted in 100 fields was 117. About a week after the second dose (4 to 5 c.c.) it was 8. Two days after the third dose (5 c.c.) it was 2. Two days after the fourth dose (7 c.c.), that is 17 days after the initial dose of tartar emetic, no crescents could be found at all, and next day the patient was discharged from hospital.*

A. A.

POWELL (A.) & BANA (F. D.). **Intravenous Injections of Tartar Emetic in Malaria.** [Correspondence].—*Brit. Med. Jl.* 1917. June 23. p. 858.

The writers, allured by ROGERS' account, tried intravenous injections of tartar emetic in three cases of benign and three of malignant tertian, beginning in one case with half a grain and in the others with one grain. In not one case was there any abatement in either gametocytes or schizonts, and in one case of benign tertian the number of gametocytes was increased. Nor was any favourable influence upon the course of the fever observed.

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* D. THOMSON (1911) showed that quinine given in doses of 20 to 30 grains daily will reduce crescents to numbers below one per cmm. within a period of three weeks—by cutting off the source of supply, the asexual forms. It is possible that the quinine treatment in Major Brodribb's case (140 grs.) was the effective cause of the crescents' disappearance.—[ED.]

A. A.

GREIG (E. D. W.). **Note on the Appearance of Malignant Tertian Rings in the Blood during Intravenous Injections of Tartar Emetic.** —*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 766–770.

In the course of an investigation of the action of antimony (intravenous injections of tartar emetic) upon the parasite of Oriental Sore, the author observed an attack of fever, associated with malignant tertian rings in the blood, in a patient who had been under the antimony treatment for nearly a month. At the time when the malaria parasites were discovered the patient had received altogether 125 c.c. of a 1 per cent. solution of tartar emetic and was manifestly under the influence of the drug, and his original sores were healing. Under quinine the fever passed off and the malaria parasites disappeared.

The original paper should be consulted, as, apart from its critical penetration, it is informative on points that lie outside the precise range of this Section.

A. A.

STEIN (Benno). **Malariaparasiten und Neosalvarsan. Zweite Mitteilung.**—*Wien. Klin. Woch.* 1917. Apr. 5. Vol. 30. No. 14. pp. 436–438.

The author's observations, in cases from Albania, confirm the view that neosalvarsan has hardly any effect on the subtertian parasite; on the small ring forms it has some effect, since injections made just before a rigor, when these forms appear, mollified the rigor and sometimes also the subsequent rise of temperature—especially at the second operation.

In benign tertian [see this *Bulletin*, Vol. 9, p. 306] all forms of the parasite are disorganised by neosalvarsan.

A. G. B.

LOW (George C.). **Diemenal in the Treatment of Malarial Fever.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Mar. Vol. 10. No. 5. pp. 97–98. With 1 chart.

" Diemenal "—a solution of " colloidal " manganese—administered hypodermically in a dose of 10 c.c. per diem for four to six days, has been proclaimed a specific cure for malarial fever. The author tested it in a case of benign tertian at the Albert Dock Hospital, and found that after the fifth daily injection malaria parasites were still present in the blood, and that the periodic rise of temperature occurred if the patient were not kept strictly at rest in bed.

A. A.

DEUTSCH (Felix). **Tiefenbestrahlung der Milz bei Malaria.** [Deep Irradiation of the Spleen in Malaria.]—*Wien. Klin. Woch.* 1917. Feb. 15. Vol. 30. No. 7. pp. 207–209.

After some account of previous attempts to influence malaria by deep irradiation of the spleen, including those of SKINNER and CARSON [*British Medical Journal*, 1911, Feb., p. 431], the authors describe their own technique and the results observed in 27 chronic cases from Albania—10 of benign tertian and 17 of malignant tertian—in the course of several months of treatment.

In almost all cases, whether otherwise successful or not, the spleen was reduced quickly. Of the 10 benign tertians 7 could be regarded as cured, being free from fever and gametes for six months, and as a rule the effect was apparent after the first sitting, for the next due relapse failed to appear: of the 3 failures, 1 was also quinine-resistant, and the other 2 were preliminary experiments with lower dosage. Of the 17 subtertians all of which had been treated unsuccessfully with quinine and salvarsan, and also received a higher dosage— 9 were not influenced; in 4 the attacks ceased for four weeks; and in 4 there was freedom from fever and parasites for several months.

A. G. B.

SCHIMERT (Gustav). **Eigenserum bei Malaria tropica. Beiträge zum Wesen und zur Behandlung des Tropenfiebers.** [Treatment of Tropical Malaria with the Patient's own Serum.]—*Wien. Klin. Woch.* 1917. Apr. 5. Vol. 30. No. 14. pp. 432–436.

Seventy severe cases of chronic tropical malaria, either uninfluenced or apparently adversely influenced by quinine, were treated with their own serum. 30 c.c. of blood was drawn during a febrile rise, was stood in a sterile vessel from 6 to 24 hours, and 5 to 7 c.c. of the separated serum was re-injected after 3 to 5 days. The quinine was interrupted for a few days or weeks. The injection had no direct effect on the parasites, but almost without exception the general condition was improved, and later the patients reacted better to quinine. No bad effects were observed.

A. G. B.

MEYERSTEIN. **Die Wassermannsche Reaktion bei Malaria.**—*Münch. Med. Woch.* 1917. Mar. 13. Vol. 64. No. 11. pp. 366–368. With 6 charts.

The results of the author's experiments are summarized as follows:—

1. The Wassermann reaction often turned out positive in tertian malaria during the first days after an access of fever, particularly with the ethereal-heart-extract of LESSER. After the tenth day it was seldom positive, particularly in obstinate cases having a tendency to relapse.

2. This Wassermann reaction depends on, but does not coincide completely with, the presence of malaria parasites in the blood: it disappeared, simultaneously with the parasites, under the influence of quinine, and also in two cases treated with neosalvarsan.

3. It is unlikely that the disappearance of the Wassermann reaction during the treatment of a case of malaria signifies any final cure. On

the other hand cases of malaria that—apart from any question of syphilis—give a positive Wassermann reaction must be considered as requiring further treatment.

[It may be mentioned that it is well known at the Royal Albert Dock Hospital that patients suffering from malaria and other diseases due to true Protozoa give a positive Wassermann reaction.]

A. A.

KING (W. V.). **The Effect of Cold upon Malaria Parasites in the Mosquito Host.**—*Jl. Experim. Med.* 1917. Mar. Vol. 25. No. 3. pp. 495–498. With 2 plates.

The experiments recorded were made with *Anopheles quadrimaculatus* as host of the parasites of tertian malaria. They show that the parasites of benign tertian can survive exposure to a temperature of 30° F. for a term of 2 days, of 31° F. for 4 days, and a mean temperature of 46° F. for 17 days; and that the sporonts of subtertian may survive a temperature of 35° F. for 24 hours.

A. A.

LEIPOLDT (C. Louis). **A Note on the Blood Pressure of Malarious Children.**—*Med. Jl. of S. Africa.* 1917. Jan. Vol. 12. No. 6. pp. 94–95.

This paper is an invitation to other observers, and for that purpose is a helpful one not only for its bibliographical references but also for its general acumen. Sixty-three children between the ages of 8 and 15 were examined; all were still cachectic and had spleens, though none was then taking quinine. The observations show a slight increase of systolic pressure and generally a slight decrease of diastolic pressure—the respective normal standards for corresponding ages being accepted from the American observations of JUDSON and NICHOLSON, and not estimated locally by experiment.

A. A.

ROW (R.). **On a Simplified Technique of Bass's Method of cultivating Malarial Parasites *in vitro* and a Few Observations on the Malarial Parasites cultured by this Technique.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 388–392. With 7 plates, 4 charts & 1 fig.

The apparatus required is (1) an anaerobic culture-tube with a well-fitting india-rubber cork; (2) a smaller culture-tube with a broad flat bottom for the cultivation of the parasites; (3) a pipette and nipple; (4) pyrogallic acid; (5) strong caustic soda solution; (6) human blood-serum; (7) some 25 per cent. glucose solution; and finally, the malaria-infected blood, which is drawn at the bedside in a capillary pipette and defibrinated on the spot by shaking after the ends of the capillary pipette have been sealed.

The smaller culture-tube can be made from a piece of glass tubing about 0·8 cm. diameter: one end is sealed and blown into a bubble, which is then shaped into a flat hollow foot, so as to form a broad-bottomed receptacle upon which the blood corpuscles settle in a thin layer in the course of incubation.

Into this culture-tube a drop of the glucose solution, a nippleful of human blood-serum, and two or three drops of the defibrinated malaria-infected blood are introduced in quick succession: after mixing, the tube is plugged.

The culture-tube is then placed inside the anaerobic culture-tube, the bulb of the latter having been charged with a few grains of pyrogallic acid and a nippleful of caustic soda solution. The upper part of the anaerobic tube is now quickly flamed to expel air, and is then tightly corked.

The whole is now placed upright in an incubator until required for examination.

Seven coloured plates of cultures, each plate accompanied with the temperature-chart of its corresponding case, form most of the second part of the memoir. The plates illustrate, severally, the growth of the quartan, the benign tertian, the malignant tertian, and the quotidian parasite—the author being of opinion that the last, on its culture-characters, is a distinct species.

A. A.

BALLIN. **Zahlenmässige Feststellungen der Malariaplasmodien im Blute.** [Counts of Malarial Plasmodia in the Blood.]—*Deut. Med. Woch.* 1917. June 7. Vol. 43. No. 23. pp. 719–720. With 3 charts.

The author, writing from Constantinople, is not aware that any method of counting the parasites in peripheral blood has been devised. He describes with much prolixity leucocyte-ratio methods, and regards this method as more accurate with thin films than with thick.

[ROSS and THOMSON (1910) showed that this method gives a large compound error. They counted all the parasites in a measured quantity of blood, which was made into a thick film, haemolysed, and stained for the purpose. Thirty-three cases were thus studied (*Annals of Tropical Medicine and Parasitology*, Vol. 4, pp. 267–306)].

A. G. B.

TRIBONDEAU (L.) & DUBREUIL (J.). **Deux procédés pour la recherche rapide des croissants dans le sang des malades suspects de paludisme.**—*C. R. Soc. Biol.* 1917. May 19. Vol. 80. No. 10. pp. 494–495.

The authors state that the search for crescents is facilitated after haemolysis in a mixture of 1 part alcohol to 2 parts distilled water. The blood may be haemolysed in the fluid state and then centrifugated; or a thick smear may be made and haemolysed after drying. The stain recommended is ammoniated polychrome blue.

A. A.

MANAUD (A.). **Coloration vitale de l'hématozoaire du paludisme.**—*C. R. Soc. Biol.* 1917. May 19. Vol. 80. No. 10. pp. 472–474.

"Vital" staining is effected by catching a drop of infected blood on a cover-glass, which is then laid, face downwards, upon a droplet of alcoholic solution of Borrel blue or methylene blue that has been allowed to dry upon a slide, and then ringing with paraffin. By this method, it is claimed, the young free forms at the moment of sporulation are better observed, and also the effect of antimalarial drugs can be studied.

A. A.

CARNOT (Paul). **Sur le mécanisme de la disparition des schizontes dans le sang périphérique au cours des accès de paludisme.**—*C. R. Soc. Biol.* 1917. June 16. Vol. 80. No. 12. pp. 575–578.

The author's investigations do not confirm the theory that the rapid disappearance of the schizonts from the peripheral blood is simply due to their sequestration in the vessels of the spleen and liver; but they give countenance to the theory that the parasites are destroyed by certain properties of the serum, these properties being derived partly from the leucocytes—particularly the large uninuclears —and partly from the spleen cells.

A. A.

LEGER (Marcel). **Considérations hématologiques sur deux cas d'accès pernicieux comateux à** ***Plasmodium praecox*****, traités par la quinine.** *Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 492–501.

After reviewing very briefly the not quite concordant statements of antecedent observers, the author describes in considerable detail the phenomena observed in a series of films taken from a case of comatose subtertian under treatment in French Guiana with injections (intravenous and intramuscular) of quinine. In the films taken when the influence of quinine was plainly manifest no very young "epiglobular" forms could be found, and the older intracorpuscular forms were stumpy, devoid of pigment, and unevenly stained, but their caryosome remained intact. In later films the protoplasm of the intracorpuscular forms was broken up, and finally disappeared or refused to stain, though the caryosome persisted. No remarkable changes were noticed in the parasitised red-blood-cells themselves. Leucocytes charged with pigment were observed throughout the series of films. Arneth's leucocyte count, which on the patient's admission was shifted to the left, gradually returned towards the normal under the influence of quinine. The author emphasises the statement that no gametocytes could be found in any films either of this series, or of a second case of intense subtertian infection which was observed with equal care.

A. A.

HOFFMAN (Frederick L.). i. **A Plea and a Plan for the Eradication of Malaria throughout the Western Hemisphere. An Address read in Abstract before the Southern Medical Association. Tenth Annual Meeting, Atlanta, Georgia, November 14, 1916.**—65 pp. Newark, N. J.—Prudential Insurance Co. of America.

ii. **A Plea and a Plan for the Eradication of Malaria.**—*Southern Med. Jl.* 1917. Apr. Vol. 10. No. 4. pp. 309–311.

i. The author has already ably identified himself with the cause that he champions—the extirpation of malarial diseases from the western hemisphere. In this pamphlet he expounds and vindicates his theme in a style so clear, so thorough, and so concise that no citizen, however heedless or obtuse, can fail to understand the causes and effects of malaria and the possibilities of their control; and outlines his plans of prevention in a form at once so comprehensive and so particular that no civil administration can fail to see how these possibilities of control may be realised. Unlike the ordinary roll of zealous propagandists, the author founds his argument upon a historical consideration of well-established facts.

ii. This is a summarized version of Hoffman's pamphlet. It suggests, *inter alia*, (a) a preliminary investigation by an appropriate committee of the Senate; (b) an advisory and executive board, consisting of the Surgeon-Generals of the Army and Public Health Service, and the Secretary of the Department of Agriculture, and provided with a grant of 250,000 dollars, more or less; (c) the active co-operation of (among others) the Director of the States Laboratory of Hygiene, the Chief Engineers of the Army, the Surgeon-General of the Navy, the Directors of the Geological, Biological, and Entomological Surveys, of the Reclamation Service, and of the Departments dealing with Soils, Vital Statistics, and Weather; (d) the enlisted assistance of (among others) appropriate Scientific Institutions, Societies, Museums, Scientific Departments of State Universities, and Societies and Associations of Medicine and Public Health; (e) the auxiliary efforts of the educational authorities. The ultimate issue would be an Advisory Council, under which malaria in all its relations would be investigated accurately and exhaustively and at last focussed, and whose official recommendations regarding the control and prevention of malaria by public works, education, and sanitary legislation, would have the highest possible sanction. The international aspects of the question are also considered.

A. A.

LAVERAN (A.). **La prophylaxie du paludisme dans l'Armée d'Orient.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 450–455.

The distinguished author recapitulates the general principles of malaria prevention for a military force occupying an area where malaria is endemic. He summarises the measures to be taken against Anopheles mosquitoes, their larvae, and their bites; describes the method of administering quinine to the troops and to the indigenous population; and indicates sanitary precautions of a subsidiary kind against various conditions that predispose to, or aggravate, attacks of malaria.

A. A.

LEGROUX (R.). **Présentation du Matériel de Prophylaxie anti-paludique destiné à l'armée d'Orient.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 421–427. With 1 plate & 3 figs.

A brief description of the anti-malarial machinery established for the French Army of the East in the current year. The personnel consists of 4 administrative and 20 executive medical officers, 100 quinine-dispensers, and a sanitary corps of 300 men. The country occupied by the French troops is divided into districts, to each of which is allotted an executive staff provided with motor-cars and sufficient bicycles. The duties of the district staff are to ascertain the local spleen-index, to contrive measures for the control of Anopheles mosquitoes in the immediate vicinity of the troops, and to superintend the administration of quinine to the troops and to the native population. The measures adopted for the control of Anopheles are either oiling or filling-in (according to circumstances) the stagnant breeding-places near camps and halting-stations, and clearing and alternately damming and flushing streamlets: for protection against the adult insects, mosquito-nets and veils, mosquito-tents, screening of doors and windows of hospitals and barracks, systematic capture by hand and by traps, cresyl fumes generated by a Bouet-Roubaud lamp, etc. Preventive quinine is issued to the native adult population in the form of hydrochloride tablets of 20 cgm., two or three daily, according to circumstances: for children an appropriate dose of quinine is disguised as a sweety and for infants it is dissolved in oil. To the troops preventive quinine is issued with the greatest care, and when necessary absorption is verified by testing the urine. A finishing touch is given to all these preventive measures by placards and humorous post cards full of wise saws and modern instances in the Autolycus vein.

A. A.

PENDE (N.). **Il problema della cura dei soldati malarici.** [The Problem of Treating Soldiers suffering from Malaria.]—*Policlinico.* Sez. Prat. 1917. May 20. Vol. 24. No. 21. pp. 679–682.

The author points out the serious loss in effective troops, resulting from the prevalence of malaria in the Italian Army. He pleads for the establishment of special hospitals in which all soldiers suffering from malaria should be efficiently treated for at least three months, and that they should then be sent back direct to their units, instead of proceeding on furlough.

J. B. N.

FERMI (Claudio). **La profilassi antimalarica in due città sarde.** [Antimalarial Prophylaxis in Two Sardinian Towns.]—*Ann. d'Igiene.* 1917. Apr. 30. Vol. 27. No. 4. pp. 228–236.

Notes on the use of paraffin and other methods for destroying mosquitoes as employed in two Sardinian towns, Terranova Pausania and Alghero. The population of the two localities is not stated, nor are any figures given of the amount of malaria prevailing before the undertaking commenced. Mention is made of powdered cork, used for the manufacture of linoleum, as a material for covering the surface of water in wells, when the water is dipped out in buckets. By slapping the bottom of the bucket against the surface of the water, before dipping, the particles of cork are driven right and left, and then the bucket can be filled with water without taking up more than a few particles of cork. The cork suffocates gnat larvae quite effectively.

J. B. N.

VILLUENDAS (Florencio). **Campaña sanitaria contra el paludismo. Llevada a cabo en la zona de Guantanamo en el mes de Abril de 1916 por disposicion de la direccion de Sanidad.** [Sanitary Campaign against Malaria, instituted in the District of Guantanamo (Cuba), in April 1916 by Official Order.]—*San. y Benefic. Bol. Ofic. Habana.* 1916. Apr.-June. Vol. 15. Year 7. No. 4–6. pp. 692–737.

A report on measures officially taken to bring malaria under control in various estates and factories in the district of Guantanamo (Cuba). A large number of coloured workers come to these estates from the neighbouring islands of Haiti and Jamaica, and bring malaria with them. The evidence collected showed that there was a general lack of precautions for isolating such cases, when ill, so as to prevent infection. Suitable orders were issued to this end, together with directions for oiling all collections of stagnant water, and for furnishing returns of cases in future. The greater part of the report is of the nature of official correspondence.

J. B. N.

CIAVALDINI. **Six ans de campagne antipaludique à Robertville (Dt. de Constantine)** (1910–15).—*Malariologia.* 1917. Apr.1 5. S. 2. Year 3. No. 1–2. pp. 22–24. With 1 chart.

Robertville is an Algerian village with very marshy surroundings where malarial fevers associated with pyrexial haemoglobinuria were rife prior to 1910, when preventive measures were initiated.

In 1909 the number of deaths from these fevers was 30 ; in 1910, when first the population was systematically quinined, it was 3 ; in 1911, with systematic quinine and oiling of breeding-places of Anopheles, it was 1, the number of cases of malaria falling by one-fourth ; and in 1912 there were no deaths, the number of cases falling by more than another half. In 1913, in addition to the systematic issue of quinine, clearing of vegetation, filling-in of pools, and canalisation were carried out extensively, and since then there have been no deaths, nor cases of haemoglobinuric fever, and the number of cases of malaria has still further decreased, notwithstanding the general recrudescence of the disease all over Algeria in 1915.

A. A.

SICARD (J. A.), RIMBAUD (L.) & ROGER (H.). **Paralysies graves du nerf sciatique consécutives a des injections fessières de quinine.**—*Paris Méd.* 1917. Jan. 6. Vol. 7. No. 1. pp. 10–13. With 1 text fig.

The authors have seen in the last few months 15 cases of sciatica with much pain and almost complete paralysis of the lower limb, the result of quinine injections in the buttock badly given, chiefly in Salonika. In seven out of ten of these nurses (*infirmières*) were responsible. Two patients not having improved after a year have had to be invalided from the army. After giving, with a figure, the chief features of the course and position of the nerve after it emerges through the sciatic notch, the authors recommend a region marked out by a line drawn from the upper end of the gluteal fold perpendicularly to the axis of the body: any injections given above this will certainly avoid the nerve. If the quinine is injected into the nerve trunk it has a destructive effect, as the authors say they have proved in the laboratory. A deposit in the immediate neighbourhood may produce the same symptoms. Details are given of six cases.

A. G. B.

CASALIS DE PURY (G. A.) & RICHET (Charles) fils. **Le traitement chirurgical des nécroses quiniques.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Jan. 18. 3 Ser. Vol. 33. No. 1–2. pp. 103–105.

The authors describe the surgical treatment of a case of quinine necrosis, a condition which appears to be common in French experience. It is not due as a rule, they think, to sepsis but rather to the injection of a too concentrated solution, and is comparable with the condition produced by an injection of zinc chloride or caustic potash. Recovery under the usual treatment is a matter of weeks or months. The patient had received two injections a day in the buttocks between 14th September and 5th October. On 12th October there was swelling, redness and pain over the part. In mid-November an incision was made, giving exit to a yellow fluid. Discharge continued and on 19th December there was a punched-out sore, which is described. The patient was etherised and the sore opened up. The edges were excised for 2 cm. all round till healthy skin was reached. The base was excised completely. A gauze drain was left in till the sixth day. Union was by first intention.

A. G. B.

APPEL (Leo). **Ueber den Einfluss der Malariatertiana auf den Heilungsverlauf des Ulcus serpiginosum.** [The Influence of Tertian Malaria on the Cure of Serpiginous Ulcers.]—*Münch. Med. Woch.* 1917. Mar. 20. Vol. 64. No. 12. pp. 396–397.

After some preliminary remarks upon the subject of the therapeutic applications of antagonistic infections, the author describes four cases of septic venereal infections that appear to have yielded to a supervening malarial infection.

All four cases were foul serpiginous sores—the issue of buboes—of a most intractable kind, and attended at some stage with other venereal complications: in all four the supervention of an acute attack of malaria was succeeded almost immediately by a revolution in the sores, which started on a course of healthy granulation that soon ended in healing.

In the first case the attack of malaria—benign tertian—supervened naturally, the patient being in a region where the disease is endemic. In the other cases the malaria was intentionally superinduced by the injection of 1 c.c. of blood drawn from a malarial patient in the febrile stage.

A. A.

Bruenn (W.). **Beschleunigte Schizogonie bei Malaria tertiana und dadurch bedingte Umwandlung des Tertianfiebertypus in einen quotidianen.** [Accelerated Schizogony in Tertian Malaria and Conversion of a Tertian into a Quotidian Fever.]—*Cent. f. Bakt.* 1. Abt. Orig. 1917. Jan. 30. Vol. 79. No. 2. pp. 84–89. With 1 coloured plate and 1 chart.

In four cases of benign tertian the author has encountered numerous deeply staining parasites particularly rich in chromatin and very poor in or even devoid of pigment, in which the schizogony is completed while they still occupy only from ¼ to ½ the space of their red blood cell. The growth and schizogony of these peculiar forms is illustrated by 24 coloured figures. A temperature-chart of one case is given: it covers 13 days, and shows two tertian accesses of fever in the first four days, and a rise of temperature from a point slightly below the normal on the fifth and sixth days, the temperature thereafter being slightly subnormal.

A. A.

Le Prince (J. A. A.) & Griffitts (T. H. D.). **Flight of Mosquitoes. Studies on the Distance of Flight of** ***Anopheles quadrimaculatus.*** —*Public Health Rep.* 1917. May 4. Vol. 32. No. 18. pp. 656–659. With 3 figs.

A. quadrimaculatus was selected as being, probably, the principal carrier in the Southern States. The insects were caught, stained by spraying with a 1 per cent. aqueous solution of eosin, and then liberated from a breeding area. From 900 to 1,000 were thus treated. Of those liberated from an extremely prolific breeding-place, four were recovered, engorged, one at a distance of 1,855 yards, but none beyond this. Of those liberated from a less prolific breeding-place, three were recovered, all at a distance of 1,030 yards, the first 800 feet of the flight being across a river.

A. A.

Mitzmain (M. Bruin). **Anopheline Mosquitoes. Their Distribution and Infection under Field Conditions.**—*Public Health Rep.* 1917. Apr. 13. Vol. 32. No. 15. pp. 536–540.

The main purpose of the investigation recorded in this paper was to ascertain in a given area in Lat. about 34° N. the relative proportion of Anopheline species and the seasonal limits of their infection.

Two species, *A. punctipennis* and *A. quadrimaculatus*, were found to invade dwellings, the former, however, having a much greater preference for cattle-sheds, out-houses, privies, and spaces beneath dwellings, and a very much less marked predilection for dwelling-rooms than the latter.

Of the 1,377 specimens collected between 17th September and 15th November, 709 were examined. A specimen of *A. quadrimaculatus* examined on 21st September and one of *A. punctipennis* examined on 29th September were found to be infected. In another *A. quadrimaculatus* examined on 15th November a single oocyst was found, which was recognised as similar to oocysts known experimentally not to develop at this season.

A A.

TAYLOR (F. H.). **Malaria Mosquito Survey of Irrigation Areas in the Murray River District.**—*Commonwealth of Australia. Quarantine Service.* Service Publication. No. 12. 1917. 32 pp. With 28 figs., 1 map & 6 plans.

The survey embraced the irrigation districts of a considerable extent of the Murray basin, where it is proposed to establish returned men of the Commonwealth Forces, many of whom may have served in countries where malaria is endemic. *Anopheles annulipes*—a confirmed carrier—was found throughout the area surveyed, usually in abundance and close to dwellings. It is not possible to summarize the report, but it shows that this extensive survey has been conducted with great ability and with the most complete and discriminative attention to detail.

A. A.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 10.] 1917. [No. 4.

BERIBERI.

Egan (Percy B.). **An Outbreak of Beri-Beri in the 'Empress of Asia.'**—*Jl. Roy. Nav. Med. Serv.* 1917. Apr. Vol. 3. No. 2. pp. 195–201.

The author gives an interesting record of an outbreak of beriberi in a mercantile ship employed on war duties. There were 38 cases, 34 in Chinese stokers, 3 in Chinese seamen, and 1 in a European. It is noted that the Chinese were obtained with difficulty, most of them were young and inexperienced, and more than half of the beriberi cases occurred in men who came from agricultural work in the Canton district. They were supplied with polished rice, fresh meat and vegetables; attempts were made to use unpolished rice but the men would have none of it. Later, at the suggestion of Castellani, Calcutta rice was issued and there was a cessation of the outbreak. There were two clinical types: a mild form with slight oedema but no cardiac symptoms, seen in 31 cases; a cardiac form with marked thoracic discomfort, oedema of the face, rapid pulse and cantering rhythm of the heart, seven cases, five ending fatally in about three days. The only European attacked was the senior engineer, who was finally invalided to England. The high percentage of stokers affected is very marked.

The cases as they occurred were isolated as far as possible and it is remarked that they appeared in batches of three or four and the patients had been sleeping in close proximity to one another.

P. W. Bassett-Smith.

Moriyasu (R.). **[Beri-Beri in Korea.]**—*Chosen Igakkwai Zassi.* 1913. Jan. 20. No. 3. pp. 3–34. With 3 photographs. [Abstract based upon Review by R. G. Mills, in *China Med. Jl.* 1917. Jan. Vol 31. No. 1. p. 74.]

From Jan., 1910, to Sept., 1912, there were only 13 cases in Koreans out of a total of 12,732 out-patients treated in the Government hospital at Seoul, but among the Japanese there were 473 patients. The greatest number occurred in the summer months and the ages ranged between 21 and 30 years; most of them were either unmarried men or married women. The Japanese practically always used polished rice but the Koreans lived on hand milled or water milled rice, which was only partially deprived of its outer layers P. W. B-S.

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Van den Branden (F.) & **Dubois** (A.). **Contribution à l'étude de l'étiologie du Béri-Béri.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 123–124.

At Bokala in the Belgian Congo beriberi occurred in 1913 as a small epidemic, with nine cases all terminating in cure, and in 1914 there were four sent to the hospital, of which one was fatal. There was also a fifth case which died on board the boat while being transferred from Bokala to the hospital at Leopoldville. The first fatal case showed marked enlargement of the liver and spleen and was infected with ankylostomiasis. The affected natives subsisted mostly on manioc with meat and fish; they never used rice in the dietary. There were no cases in 1915 and 1916.

P. W. B-S.

Fraga (Clementino). **Beriberi ou syndrome beriberica?** [Beriberi, a Disease or a Symptom?].—*Brazil Medico.* 1917. Jan. 13, 20 & 27, Feb. 3. Vol. 31. Nos. 2, 3, 4, 5; pp. 9–11, 17–18, 25–27, 35–37.

A discussion of the well-worn topic whether beriberi is an independent disease, or a complex of symptoms dependent upon defects of diet. The author, of course, discusses the subject mainly from a Brazilian point of view, it being a moot question in Brazil whether the so-called malarial polyneuritis of the Amason region is really due to malaria or is in fact beriberi. The present paper unfortunately does not supply many new facts for the solution of this problem, being mainly in the nature of a review. An interesting table, however, is given at the end which shows that, whatever the reason may be, there has been a substantial reduction in the number of deaths from beriberi in the city of Bahia during the last 10 years. From 1897 to 1908 deaths from beriberi contributed, on an average, 2 per cent. to the total mortality of the city, but the year 1909 witnessed a sudden drop, with the result that in 1915 deaths from beriberi furnished only 0·5 per cent. of the total mortality. To what this sudden reduction should be ascribed does not appear.

J. B. Nias.

Lindsay (John W.). **Some Observations on Brazilian Beriberi.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Mar. Vol. 10. No. 5. pp. 89-93.

A disease which commences with fever and is characterised by cardiac trouble, dropsy, loss of power and pains in the legs, and signs of peripheral neuritis is fairly common in Corumba and district (Matto Grosso). It generally affects men in the low-lying districts and in the summer months. It may be acute or chronic and is looked upon as a form of beriberi. High altitudes with bracing climates are most suitable for cure. Diet seems to play no important part as it is said to be plentiful and varied. Officially the disease is considered to be a "quinine-resisting form of malaria."

P. W. B-S.

LEBREDO (Mario G.). **Beri-Beri. An Epidemiological and Experimental Study.**—*San. y Benefic. Bol. Ofic.* 1916. Jan-Mar. Vol. 15. No. 1–3. pp. 141–154.

The author after a careful epidemiological and experimental study of small epidemics of beriberi in Cuba concludes that there are two necessary factors in the etiology of the disease, one purely alimentary or predisposing, causing polyneuritis of a chronic type, and one of toxic origin which gives rise to acute, sub-acute, and perhaps chronic infections. In three epidemics where the disease was undoubtedly due to rice consumption and the mortality was high, he isolated from the incriminated rice a spore bearing organism which produced a toxic substance (not isolated) "developed from the amylaceous elements of the rice through the action of a ferment, which attacked the nervous system." The spores resisted a temperature of 100° C. for 20 minutes, and after three days assumed a cigar form. They grew in the boiled rice but not well on other media. He believes that the germ exists naturally in the rice grain, which becomes infected in the packing after being polished, and that the pericarpal pellicle serves as an excellent protector. The toxin is very virulent, killing guinea-pigs when the rice water containing it is injected intraperitoneally in doses of from 10 to 16 cc. in from one and a half to nine hours. The pathological findings were, diminished coagulability of the blood, dilatation of the right side of the heart, pericardial and pleural effusions, and some gastro-ileojejunitis. Small doses given intra-cerebrally were also fatal, symptoms of paresis of the hind limbs preceding death. Administration subcutaneously or intravenously was ineffective. The toxin seems to have an exclusive and direct effect on the nervous elements. In chronic cases, when the guinea-pigs during feeding experiments lived from one to four months, it is suggested that small doses of the toxin at first acted on the nerve tissue, sensitising it without producing symptoms, but that further doses sooner or later are associated with evidences of acute intoxication. The same may be the case in man.

P. W. B-S.

MASSALONGO (R.). **Polinevrite acuta a forma béribérica; contributo ad una teoria degli ormoni vegetali.** [Acute Polyneuritis; a Form of Beriberi. Contribution to a Theory of Vegetable Hormones.] —*Riforma Med.* 1916 Nov. 27. Vol. 32. No. 48. pp. 1316–1322.

The author describes a case of acute polyneuritis in an Italian soldier under his own observation. He gives a discursive account of recent work on the etiology of scurvy, beriberi, and pellagra, and points out how frequently marked central nerve symptoms are present in cases with beriberi-like symptoms.

At the present time, when deficiencies of dietary are common owing to the exigencies of war service, through the increased consumption of tinned and sterilised foods, the want of vitamines is specially prevalent. He believes that the avitamine syndrome and deficient formation of endocrinic hormones are produced by an alteration of the gland fluids consequent on an assimilation of food deficient in alimentary hormones, which produces a profound alteration in the nervous and other systems, and that these are best supplied by an abundance of fresh fruit and vegetables. These should therefore form an essential part in the war ration.

P. W. B-S.

FLORAND. **Sur un cas de béribéri.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 8. 3 Ser. Vol. 33. No. 7–8. pp. 430–431.

The author describes a case of beriberi under his treatment in the hospital of Val-de-Grace. The neuritis affected the lower limbs only and there were no vaso-motor symptoms. The patient was one of 2,600 Annamite labourers who had recently been landed in France, but it is noted that 80 of these suffered from the disease while on the ship, some of whom died from cardiac attacks. JEANSELME stated that he believed that he was right in saying that cases of deaths occurring in series without known cause in the prisons of the Far East were nearly always due to latent epidemics of beriberi in the establishments, and that it was an infectious disease.

P. W. B-S.

MULVANY (John). **The Influence of Beri-Beri on the Body Weight.**—*Indian Med. Gaz.* 1917. Mar. Vol. 52. No. 3. pp. 98–99. With 1 chart.

In Indian jails careful records are kept of the body-weight of all prisoners ; it was therefore possible for the author, who was in medical charge of one of these, to note the variations in a case of beriberi which occurred. After the onset of the symptoms of neuritis there was a slow loss of weight of 11 pounds, and a gradual recovery to his normal in seven weeks when he returned to moderate labour. The following month the man had an attack of dysentery which caused a greater loss and this was followed by a recurrence of the beriberi in a more severe form, which was to be expected.

P. W. B-S.

SUZUKI (T.). [**The Amount of Sugar in the Blood of Nurslings suffering from Beri-Beri.**]—*Tokyo Igakukai Zassi.* 1916. Oct. 5. Vol. 30. No. 19. pp. 29–76. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 174.]

The author, using Bang's micro-method, found that the average amount of sugar in the blood of nursing infants suffering from beriberi was 0·0808 per cent., and this hypoglycemia is practically constant irrespective of the type of the disease, stage, or state of nutrition, the blood of the mothers being practically always normal. He determined that the other causes of malnutrition had nothing to do with the causation of the condition. From animal experiments he found that injections of thymus extract had no influence upon adrenalin hyperglycemia. Marked hypoglycemia followed the extirpation of the adrenals of dogs and when thus produced the amount of sugar was much reduced by injections of thymus emulsion. From these experiments he concludes that the hypoglycemia of nursing beriberi infants is based upon an insufficiency of the adrenal function.

P. W. B-S.

KANAI (S.). **[Beri-Beri, Question of Existence of So-Called Toxin of Inoue.]**—*Saikingaku Zassi.* 1916. Oct. 10. No. 253. pp. 63–69. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 177.]

The author repeated the experiments upon which the claim of the existence of this toxin in the blood of beriberi patients was based, and was convinced that the symptoms of ascending paralysis following the intra-spinal injection of blood were due to pressure and the introduction of foreign proteins.

P. W. B-S.

ONO (S.). **[Adrenalin Content of the Supra-Renal Glands of Cadavers of Patients dying from Beriberi.]**—*Jikwa Zasshi.* (*Jl. Pediatrics*). 1916. Dec. 20. No. 199. pp. 1014–1015. [From Review by R. G. MILLS.]

Nine acute cases of beriberi and two dying during pregnancy were examined as to the post-mortem adrenalin content of the supra-renal capsules. The results of the first nine varied from 4·96 to 5·99 mgm. as compared with the normal 2·82 mgm., and those of the two fatal cases were 3·01 and 4·94 mgm. Macroscopically the medullary area appeared more fatty than normal and microscopically it was thought to be the seat of a lymphatic infiltration of a mild grade.

P. W. B-S.

ARIMA (E.). **[Observations on the Non-Protein Nitrogen Blood Content in Cases of Beriberi.]**—*Tokyo Igakukai Zasshi.* (*Mitteil. d. Gesellsch. z. Tokio*). 1916. Nov. 5. Vol. 30. No. 21. pp. 1–27. [From Review by R. G. MILLS.]

Twenty-six cases were examined with the Strauss methyl-alcohol method :—

Sensory motor forms,	13 cases,	32·7–61·0 mgm.	Average,	45·02	mgm.
Oedematous type,	4 ,,	41·2–60·0 ,,	,,	46·0	,,
Acute pernicious type,	10 ,,	46·7–73·0 ,,	,,	67·27	,,

For comparison :—

Healthy Japanese (ONISHI) ..	14·0–30·3 mgm.
,, Europeans (STRAUSS) ..	30·0–40·0 ,,
,, Koreans (Author) ..	28·4–37·4 ,,

The results are comparable with those found in chronic parenchymatous nephritis, but not with those found in uremia in which the figure may reach 200 mgm.

The cause of the increase of retained nitrogen in beriberi is believed by the author to be a disturbance in the balance between the kidney excretory function and the protein katabolism, and is not attributable to cardio-vascular failure.

P. W. B-S.

UNCLASSED FEVERS OF TROPICS AND DENGUE.

HAYASHI (C.). **[Piroplasma-Like Bodies supposed to be the Cause of Tsutsugamushi (River Fever of Japan.)]**—*Kyoto Igaku Zasshi* (*Kyoto Jl. Med. Sci.*). 1917. Jan. Vol. 14. No. 1 pp. 47–49. [From Review by R. G. MILLS.]

The author reports having found various bodies staining with Giemsa in the cells of the lymphatic glands and blood. These were rod shaped with granules, ringed and gourd-like in pairs; they were sometimes seen outside the cells. Comma shaped bodies attached to the red cells and free in the plasma were also seen. In animal experiments in which the blood was injected into monkeys, marmots, white rats, mice, and a calf the same kind of bodies were isolated, the marmots giving the best results. Injections of the spleens of wild rats also gave positive results. Trombidii collected from the ears of wild rats, made into an emulsion and injected subcutaneously into 10 marmots, gave three successful results. These various bodies were considered by the author to be different stages in the life history of the same organism, which is believed to be a piroplasma.

P. W. B-S.

OGATA (M.). **Achte Mitteilung über die Aetiologie der Tsutsugamushikrankheit.**—*Mitteil. a. d. Med. Fakul. der Kais. Univ. zu Tokyo.* 1917. Mar. 12. Vol. 17. No. 1. pp. 1–17. With 2 coloured plates.

The author in continuation of his previous investigations on Tsutsugamushi disease now gives the results of his recent work. He states that the cause of this locally important disease belongs to the filamentous fungi, but that in certain stages of development it shows numerous protozoal forms. He has now obtained pure cultures on solid media from the eruption lesion and from the blood; these show club-shaped and complex spores with filaments. From the pure cultures of this fungus he has produced the Tsutsugamushi disease experimentally in animals (guinea-pigs, rabbits, etc.), just as well as if the tissue emulsions or blood of infected animals had been used for the inoculations. Two coloured plates with many figures show the appearance of the organism as seen in the blood, lymph glands, eruptive tissue, and cultures. These are mostly stained with Giemsa and are exceedingly perplexing in their variations. [The further life history through the mite which is known to carry the infection has still to be worked out.]

P. W. B-S.

i. Kawamura (R.) & Yamaguchi (S.). **[Tsutsugamushi (River Fever of Japan). The Probable Finding of the Nymph Stage of the Mite producing the Disease.]**—*Taiwan Igakukai Zassi.* 1916. Oct. 28. No. 168. pp. 359–360. [Abstract based upon Review by R. G. Mills, in *China Med. Jl.* 1917. Mar. Vol. 31. No 2. p. 179.]

ii. Miyakawa (B.), Nagayo (I.), Mitamura (D.) & Imamura (H.). **[Notes on the Mite producing Tsutsugamushi (River Fever of Japan).]**—*Ibid.* pp. 859 & 179.

iii. Miyajima (K.) & Okumura (O.). **[Tsutsugamushi (Japanese River Fever), the Egg, Nymph and Adult Form of the Mite, *Trombidium akamushi.*]**—*Saikingaku Zassi.* 1916. Oct. 10. No. 255. pp. 1–16. [Abstract based upon Review by R. G. Mills, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. pp. 175–177. With 2 plates.]

i. The authors placed a number of infected mice in a specially made zinc lined box which was partially buried in sandy soil; a month later the soil of this was examined. The adult parasite had entirely disappeared from the mice and in the soil eight-legged mites were found similar to the adults but differing in structure from the nymphs previously reported by Nagayo.

ii. In a preliminary review of this paper it is stated that the nymph forms were found in the cages in which the adult forms had been placed. Details of the structure of the larvae, nymphs and adults are given and the term *Leptotrombidium akamushi* is used for the species.

iii. A summary is given of the previous work on the development of these mites from observations extending over several years by different authors. They were able to trace the changes in the various stages from egg to adult form. A certain amount of moisture was found to be essential for the metamorphosis of the nymphs and the damp sand had to be protected from the direct rays of the sun. The amount of previous feeding made a considerable difference in the size of the adult mite. Temperature also was important; the change from larva to nymph taking place in 6–8 days in August but requiring three weeks in June. Details are given of the anotomical characteristics in each stage which are too technical to quote, and three plates showing these are supplied.

P. W. B-S.

Nagayo (Mataro), Miyagawa (Yoneji), Mitamura (Tokushiro) & Imamura (Arao). **On the Nymph and Prosopon of the Tsutsugamushi, *Leptotrombidium akamushi*, N. Sp. (*Trombidium akamushi* Brumpt), Carrier of the Tsutsugamushi Disease.**—*Jl. Experim. Med.* 1917. Feb. Vol. 25. No. 2. pp. 255–272. With 4 plates.

Tsutsugamushi, better known as Kedani disease, is very prevalent in the northern parts of Japan and gives rise to a mortality of 20 to 50 per cent. A somewhat similar condition has been described from Formosa and Deli, and it appears to be allied to Rocky Mountain Spotted Fever. The authors have in previous works attributed the disease to a piroplasma-like body but the cause is still uncertain. It is however definitely known that the infection is carried by small species of mites (very like the red bug *Leptus autumnalis*), which are extremely common and greatly feared. The paper is very technical but it may be said that from a careful study of all the forms found in the endemic region they were able to demonstrate five species of Trombidium and from the well-marked specific characters they feel justified in forming a new genus and species for the infecting agent, *Leptotrombidium Akamushi,* which biologically differs from the rest in that the adult female does not deposit its eggs in heaps, and the larvae hatch out all the year round and feed on mammals. Adult females were found in open fields; these were kept and from them larvae were bred, but no eggs were discovered. (It is possible that the animal may be viviparous.) These were followed through in the nymph stage to the prosopon. Each stage shows distinctive characters by which it can be recognised from the other mites. The tsutsugamushi larvae were obtained mostly from infected mice, the lobes of the ears often being thickly covered, but in the open fields the mites are very difficult to discover as they hide in the earth. It is the larval form which acts as carrier of the disease. The plates show very well the characters of the mites in their different stages.

P. W. B-S.

ARCHIBALD (R. G.). **Seven-Day Fever in the Anglo-Egyptian Sudan.** —*Jl. Trop. Med. & Hyg.* 1917. June 15. Vol. 20. No. 12. pp. 132–135. With 4 charts.

The author recently carried out some observations on a total of 300 cases of seven day fever among the British and Egyptian troops of the Sudan Western Frontier Force. The disease, which affected all nationalities, appeared in June after the rains. He divides the cases into two types, one clinically resembling dengue, the other a short abortive form very like the three day fever of Chitral. No causative organism was discovered but the disease appeared to be transmitted by *S. fasciata.* Blood inoculations into a monkey gave negative results. The fever is associated with a definite leucopenia, showing a relative decrease in the polomorph leucocytes and an increase in the large mononuclears, lymphocytes, and eosinophiles.

P. W. B-S.

DE MELLO (Froilano). **Is the Seven-day Fever of Leonard Rogers extant in Gôa?**—*Bol. Ger. Med. e Farmacia.* Nova-Gôa. 1917. Jan. Vol. 4. No. 1. pp. 24–30.

The author describes in great detail a case of fever of seven days' duration with symptoms similar to those frequently seen in most of the coast ports of India, and variously termed seven day fever or dengue.

There are no original observations with regard to its etiology or treatment.

P. W. B-S.

JOHNSTON (J. E.) & MYLES (T. W.). **Some Observations on Phlebotomus Fever.**—*Jl. Roy. Nav Med. Ser.* 1917. July. Vol. 3. No. 3. pp. 326–327.

While on active service [locality not indicated] the authors observed a number of cases of severe pyrexia of short duration uninfluenced by quinine. These were most common when the temperature was high and the air was moist (from April to September). The symptoms were those generally associated with phlebotomus fever. The relative slowness of the pulse, leucopenia, absence of malarial parasites, and inefficiency of quinine, were the most important diagnostic points.

The interesting statement is made that Staff-Surgeon MYLES has observed a similar train of symptoms in cases at Sheerness which occurred in the hot summer months, July and August, in 1911. [Confirmation of this would be interesting, for phlebotomus fever has not been known to occur in England.]

P. W. B-S.

MITCHELL (D. A.). **Pyrexia of Uncertain Origin (P. U. O.) seen in Malta during the War.**—*Jl. Roy. Nav. Med. Ser.* 1917. July. Vol. 3. No. 3. pp. 316–325. With 2 charts.

During three summers spent by the author at Malta numbers of cases of pyrexia occurred among men returning from the Dardanelles and Salonika for which no definite cause could be found. It was frequently noticed that many of the short pyrexias were in surgical cases and not due to sepsis There were of course many cases of typhoid and paratyphoid " A "and " B," but besides these, two chief groups could be differentiated by the author: *first*, phlebotomus fever, generally lasting about five days but often prolonged for six or seven days; *second*, a pyrexia lasting ten or twelve days, the symptoms of which were largely negative but chiefly resembled mild types of paratyphoid " B." These cases, however, failed to give proof of this causation by culture or serum reactions, and they are considered by the author to be a distinct clinical entity. These occurred both in the summer and winter, and were found both in ships and in shore establishments. The onset was sudden, the pyrexia was of a moderate degree, the patient was in a semi-typhoidal drowsy state for the first few days, and bronchitis was often the only definite symptom; the spleen was never enlarged and no rash was present. There was generally a marked fall in the temperature about the third day, but the normal was not reached until the tenth or twelfth; a lymphocytosis is common. The differential diagnosis from typhoid, malaria, undulant fever, tuberculosis, syphilis, and dysentery, is fairly fully dealt with in the paper [In these cases from the Mediterranean area the possibility of masked serum reactions and infections by intestinal organisms other than those commonly recognised must be remembered, such as *B. alkaligenes*, and also the cases of so-called Mediterranean dengue.]

P. W. B-S.

(i). COSTA (S.) & TROISIER (J.). **Un cas de "Sodoku" (Fièvre par morsure de rat).**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1916. Dec. 7. 3 Ser. Vol. 32. No. 33–34. pp. 1931–1934. With 1 chart.

(ii). ROGER (Henri). **Les cas français de sodoku. Toxi-Infection par morsure de rat.**—*Presse Med.* 1917. Apr. 5. Vol. 25. No. 20. pp. 201–202.

i. The author describes a case in which the onset followed three days after a bite on the finger, which is an extremely short incubative period. The fever was irregular and prolonged, the lymphangitis severe, and eruption well marked. Nothing was found by blood culture and animal experiments gave negative results.

ii. The word sodoku is from two Japanese words, "so," rat, and "doku," poison. The author has been able to find records of seven cases in France and he adds another which is of special interest as the man bitten was a soldier in the trenches. This is the first recorded "war" case. The great prevalence of rats in the trenches makes it important that medical officers should be on the lookout for the disease. It is probable that this disease is not a recent importation but is endemic in the country and a case is quoted described by MILLOT CARPENTIER in 1898 which ran a fairly typical course, from which he considered that "there was strong presumptive evidence in favour of the disease being due to an unknown poison introduced by the bite of a rat."

P. W. B-S.

LAROCHE (Guy) & DUROZOY (D.). **Un cas de Sokodu.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Mar. 8. 3 Ser. Vol. 33. No. 7–8. pp. 412–417. With 1 chart.

The case described was one of slight severity. The man was bitten on the wrist. The bite caused little trouble until three weeks after, when it became swollen and painful, and there was a sudden onset of fever. On admission to hospital the initial lesion had the appearance of a large syphilitic chancre the size of a five franc piece, violet in colour and painful on pressure; there was marked lymphangitis and enlargement of epitrochlear and axillary glands; blood-stained serous fluid was obtained from the sore but no pus. A nodular eruption followed in about a week. A month after there was a fresh exacerbation of fever. Total duration of the case four months. Examination and culture of the blood from the primary lesion and epitroclear glands gave no spirochaetes, and inoculations into guinea-pigs were negative. There was at first a slight leucocytosis, 14,000 per cmm., and a mononuclear increase. The case was treated on ordinary lines, and not being severe neo-salvarsan was not given. This is the third case during the war described from France, but it is probable that undiagnosed cases are frequent.

P. W. B-S.

ARCE (Julian). **Algunas consideraciones sobre la nueva teoria dualista de la enfermedad de Carrión.** [Some Remarks on the New Dualistic Theory of Carrion's Disease.]—*Cronica Med.* Lima. 1916. Nov. Vol. 33. No. 641. pp. 377–391.

The views recently expressed by STRONG and his colleagues on the Harvard Commission [see this *Bulletin*, Vol. 2, p. 619; Vol. 5, pp. 368–9; Vol. 6, p. 322; Vol. 7, p. 70], as to the essentially dualistic nature of Oroya fever and verruga, have aroused strong opposition amongst the physicians of Peru. The author of the present paper begins by correcting a mis-statement of fact by STRONG and his colleagues as to the amount of evidence which exists as to the exact nature of the disease of which CARRION died, after inoculating himself with material from a nodule of verruga. Quite sufficient details for the purpose are to be found both in ODRIOZOLA's monograph on Oroya fever, and in the pages of *La Cronica Medica*, Vols. 3 and 6. CARRION inoculated himself on August 27th, 1885 and remained well for a period of 20 days, keeping a diary of his symptoms until he was too ill to continue it. He then sickened with a fever which proved rapidly fatal with symptoms similar to those of Oroya fever, including extreme anaemia, the number of his red cells before death having dropped to about one million per cmm. Post-mortem the macroscopic appearances of the viscera were entirely similar to those of Oroya fever, and at that time no work of any importance had been done on the microscopic histology of the disease. As there is no instance on record of Oroya fever being contracted anywhere but in the Oroya cañon and other places where it is endemic, and as CARRION had not apparently been recently in any such locality, the fair inference is and always has been, in the opinion of Peruvian physicians, that CARRION'S inoculation with verruga produced in him the fever of which he died, and which was clinically indistinguishable from Oroya fever. Arce considers this case to be of the nature of an *experimentum crucis*, i.e. without flaws, and thinks the Harvard Commission wanting in clinical perspicacity in trying to get round it. It may be added that from the 6th to the 8th day of CARRION'S illness abortive haemorrhagic pustules appeared on CARRION'S face and chest of the kind that not uncommonly herald the outbreak of verruga.

The author goes on to show that the geographical range of Oroya fever and verruga are absolutely co-terminous, and that whenever epidemics of Oroya fever break out amongst the navvies employed on the Oroya railway, as may happen when the line is blocked by falls of rock, verruga always occurs amongst them simultaneously with the Oroya fever. He defines Oroya fever as verruga with a preliminary stage so virulent as to kill the patient in the great majority of cases, while the few survivors develop, or may develop, the nodular eruption afterwards. On the other hand, verruga is never followed by Oroya fever. The Harvard Commission, he thinks, have closed their eyes to these indubitable facts.

J. B. N.

i. JUNGMANN (Paul) & KUCZYNSKI (M. H.). **Zur Klinik und Aetiologie der Febris wolhynica (His-Wernersche Krankheit).**—*Deut. Med. Woch.* 1917. Mar. 22. Vol. 43. No. 12. pp. 359–362. With 5 charts & 1 text fig.

ii. STUEHMER (A.). **Ueber eine akute Infektionskrankheit, welche mit rückfallfieberähnlichen Temperatursteigerungen, Schmerzhaftigkeit und Knochenhautödem der Schienbeine verläuft. (Periodisches Fieber.) II. Mitteilung.**—*Münch. Med. Woch.* 1917. Mar. 13. Vol 64. No. 11. pp. 368–370. With 3 charts.

iii. STUEHMER (A.). **Ueber das "periodische Fieber." III. Mitteilung.** —*Ibid.* Mar. 27. No. 13. pp. 437–438. With 2 charts.

iv. RIEMER. **Beitrag zur Frage des Erregers des Fünftagefiebers. (Vorläufige Mitteilung).** [Contribution to the Etiology of Five-Day Fever.]—*Ibid.* 1917. Jan. 16. No. 3. pp. 92–93. With 2 text figs.

v. RICHTER (Erich). **Die Behandlung des Wolhynischen Fiebers mit Kollargol.** [The Treatment of Volhynia Fever with Collargol.]—*Therap. d. Gegenwart.* 1917. Mar. Vol. 58. No. 3. pp. 88–95. With 13 charts.

i. From observation of numerous cases of this fever they are classed by the authors as (1), simple paroxysmal form of HIS and WERNER;

(2), typhoidal form; (3), rudimentary form. The onset may be marked by some mental symptoms and during the course a pale scarlatiniform or small papular rash is sometimes found. Jungmann found active diplo-bacilli of dumbbell shape in the blood of cases, and after intraperitoneal injection of infected blood into guinea-pigs he obtained similar bacilli from the spleen, liver, and bone-marrow as well as from the circulation. Bacilli of the same character were found in the excreta of lice and the disease was produced in one of the authors (K) by bites of infected lice. Few details of the experimental work are given.

ii and iii. A number of cases are quoted mostly with typical symptoms. The author divides them into three groups according to the severity of the attack, (1) "Stadium septicum"; (2) "S. mutationis"; (3) "S. metastaticum." He states that previous to the war he studied trypanosomes and is convinced that the disease is either due to trypanosomes or spirilla, but no experimental evidence is given.

iv. After referring to the contributions of WERNER, KORBSCH, TOPFER and others, who each have described micro-organisms as possible etiological factors, the author gives his own observations. He injected 2·5 cc. of the blood from a case of the fever into the peritoneal cavities of two guinea-pigs without any positive results, but from films of the fresh blood stained with Loeffler's methylene blue after long search one spirochaete was found (shown in plate). Blood was incubated for seven days aerobically and anaerobically, and spirochaetes were again found in the serum similar to the one seen in the blood film. The organism has generally two turns with four waves (rarely four with eight waves), and the ends are pointed, the length being about that of the diameter of a red blood cell. They are actively motile, Gram negative, and do not show chromatin granules with Giemsa stain. They appear to increase in number in a pure culture by incubation.

v. A great number of drugs have been employed in cases of Volhynia fever, including salvarsan, neo-salvarsan, quinine, aspirin, antipyrin, pyramidon, etc., all giving more or less unsatisfactory results. The author was induced to try collargol. The solution of the drug should be prepared in freshly distilled water for each dose, and 10 cc. of a 1 per cent. solution is given intravenously. He quotes and charts 13 cases and arrives at the following conclusions:—

(1) The intravenous injections of collargol (HEYDEN) in Volhynia fever acts as a specific like that of quinine in malaria.

(2) A single intravenous injection reduces the intensity of the fever and prolongs the intervals between the paroxysms.

(3) A second injection in recent cases either kills off the exciting cause or greatly reduces its strength.

(4) A third injection in an acute case with a two or three day interval cures the disease.

P. W. B-S.

i. HILDEBRANDT. **Das Wesen des Fünftagefiebers.** [The Essential Features of Five Day Fever.]—*Münch. Med. Woch.* 1917. May 1. Vol. 64. No. 18. p. 595.

ii. WERNER (H.) & BENZLER (J.). **Zur Aetiologie und Klinik der Febris quintana.**—*Ibid.* May 22. No. 21. p. 695. With 1 chart.

iii. BUCHBINDER (Walter). **Beitrag zur Symptomatologie des wolhynischen Fiebers.**—*Wien. Klin. Woch.* 1917. Mar. 22. Vol. 30. No. 12. pp. 373–374.

iv. FRANKE (Maryan). **Ueber das Fünftagefieber (Febris quintana, febris wolhynica).**—*Ibid.* Jan. 11. No. 2. pp. 45–47. With 6 charts.

v. SCHMIDT (Franz Josef). **Blutbefunde bei Fünftagefieberkranken.**— —*Deut. Med. Woch.* 1917. May. Vol. 43. No. 22. pp. 682–683. With 3 text figs.

vi. GOLDSCHEIDER. **Zur Symptomatologie des Fünftagefiebers.**—*Ibid.* June 14. No. 24. pp. 737–739.

i. The author states that when the fever is subsiding the disease may still be diagnosed by the periodical rise in the leucocytes, and that the presence in the blood of bone marrow cells is of great importance. The causative parasite (still unknown) circulating in the blood especially affects the bone marrow and later on the liver and spleen. Eventually the disease may pass on to myelogenous leukaemia; thus five-day fever is a possible etiological cause of leukaemia. He considers that spontaneous recovery is rare and that neo-salvarsan is the best treatment. [These findings and views are very contrary to those of most other observers.]

ii. The transference of the infection of five-day fever having previously been brought about by the intramuscular injection of the blood of an acute case, further investigations were carried out to demonstrate the natural means of infection. Infections were obtained in men through the bites of lice. One of these is described in detail. Five lice were put upon an acute case and for the following eight days fed on one of the authors (W.); eight weeks after the latter developed a typical attack of the fever, he during this period not being in the endemic area, but he had six months previously suffered from the disease, apparently without obtaining any immunity. Examination of the experimental lice showed in the stomach of some of them bodies resembling spirochaetes. In one, the stomach contents showed organisms which could not be distinguished from the bodies described by ROCHA LIMA in typhus, by TOPFER in five-day fever, and previously cultured by the author anaerobically. The inclusion of many irregular clinical forms without fever, etc., by HIS and JUNGMANN the authors do not accept as instances of the true five-day fever.

iii. It is stated that the trophic and sensory nervous disturbances are very characteristic and the author relies on one special symptom to distinguish this disease from influenza and rheumatism, viz. the presence of a triangular congested patch on the soft palate pointing forwards from the uvula; in this area small vesicles are seen which strongly reflect light.

iv. The cases seen at Lemberg were at first thought by the author to be relapsing influenza but they are now recognised as instances of the new disease described by Werner and His. It is noted that the periodicity is irregular, the course mild, and the prognosis good; complications are rare, chiefly nephritis and pneumonia. With regard to the blood changes the author states that a day before the attack an eosinophilia is always present, during the attack there is a polynuclear leucocytosis and later a lymphocytosis.

v. In three patients only out of many examined the author found peculiar bodies in films taken from the peripheral blood. The bodies are almond or sickle shaped and they were generally grouped together; they show one or two round chromatin bodies in the interior situated either peripherally or centrally. Others are somewhat larger around which the smaller structures are grouped. Giemsa's stain demonstrated their characters best. The size varies and is comparable with that of blood platelets.

vi. Pain in the tibia is by many considered to be an important diagnostic feature of "five-day fever." The author brings evidence forward to show that this symptom is not diagnostic. The pain is not due to an ostitis or periostitis as is usually accepted, but is only a part of a toxaemia affecting the posterior roots and especially the lumbar plexus.

P. W. B-S.

UNDULANT FEVER.

CHIRI (C.). **Osservazioni intorno a due casi di febbre melitense.** [Two Cases of Undulant Fever.]—*Gazz. d. Osp.* 1917. Vol. 38. No. 5. pp. 68–70. With 2 charts.

The author describes two cases of undulant fever which were treated in hospital. Both were soldiers, one of whom had been wounded. There was the usual difficulty in diagnosis. The fever was proved not to be malaria nor any of the typhoid group, and the serum when treated with the *M. melitensis* reacted in high dilutions. Three strains were used, Catania, Cagliari, and Zammit, the second of which gave negative results, but (1) and (3) on the first trial agglutinated up to 1/2500, and later to 1/6400 when the serum was inactivated at a temperature of 55° C.

P. W. B-S.

MUIR (John). **Malta Fever as a Cause of Rheumatoid Arthritis.**—*S. African Med. Rec.* 1917. Apr. 14. Vol. 15. No. 7. p. 108.

Two cases are described of rheumatoid arthritis which followed attacks of undulant fever. The first contracted the fever in 1911. Arthritic complications were noticed within three months and the patient died in 1916 with clinically typical indications of rheumatoid arthritis. In the second case the onset of the fever was in 1915. The attack was very mild but the following year rheumatoid symptoms were noticed. The author attributes the articular affection to the toxin produced by the *M. melitensis.*

P. W. B-S.

CHIRIBOGA (J. M.). **Un caso de fiebre de Malta comprobado bacteriologicamente.** [A Case of Undulant Fever Confirmed Bacteriologically.]—*Cronica Med.* Lima. 1917. Mar. Vol. 34. No. 645. pp. 98–99.

The patient was a woman 40 years of age, who had always lived in Lima and entered hospital with symptoms not unlike those of enteric fever. Laboratory tests having rendered this diagnosis unlikely, further enquiries elicited the fact that the patient was in the habit of eating goat's-milk cheese at dinner. A blood-culture was then made with the result of giving a pure growth of *M. melitensis.* The case gradually recovered after a variety of internal remedies had been used, none of which produced any marked beneficial effect.

J. B. N.

CAMMARATA (Antonio). **Infezione melitense con manifestazioni emorragiche.**—*Malaria e Malat. d. Paesi Caldi.* 1916. Sept.-Dec. Vol. 7. No. 5–6. pp. 309–313.

Haemorrhagic complications in undulant fever have frequently been described, particularly from Italy. CASTRONOVO records epistaxis, haemorrhage from the gums, haematuria, and petechiae, TRAMBUSTI mentions haemorrhages from the mucous membranes of the stomach and intestines. MENSE and WURTZ speak of intestinal and urinary haemorrhages, and VIGANO of subcutaneous and renal haemorrhage. This symptom sometimes renders the diagnosis of the case very difficult unless the possibility of undulant fever be considered. In Caltanisetta regular outbreaks of undulant fever have been observed; in 1912 there were three cases, in 1913 the number rose to 96, in 1914 there were 35, and in 1915 three. In five cases a mixed infection of this fever and typhoid was noted. The author now describes three fresh cases with haemorrhagic symptoms, epistaxis, haematuria, intestinal and cutaneous haemorrhages, one of which was fatal. In all, the diagnosis of undulant fever was definitely made. In his cases, as in those of CASTRONOVO, the great fluidity of the blood was specially apparent, which accounts for the frequency of petechiae and mucous haemorrhages. [No record of the coagulability of the blood is given.] In many prolonged cases of the disease where there is a persistant anaemia, late phlebitis, arthritis and neuralgic complications are common.

P. W. B-S.

VALLARDI (C.). **Contributo alla vaccinoterapia della febbre mediterranea.**—*Riforma Med.* 1917. Feb. 24. Vol. 33. No. 8. pp. 197–202. With 1 chart.

In this interesting paper the author describes a very prolonged case of undulant fever which had during its course been variously diagnosed and treated. The fever was of a remittent undulant type, and sweats, pains and enlargement of the spleen were present. The blood when tested against the *M. melitensis* agglutinated this up to 1/1250, and later positive blood cultures were obtained.

The author first treated the patient with anti-*melitensis* vaccine given subcutaneously in doses of 50 million up to 300 million every fifth day, without any very marked result. An autogenous vaccine was prepared and given intravenously and the first dose, 25 million, provoking a smart reaction of short duration but improvement in the general symptoms, gradually rising doses were used every fifth day, 30 million, 50 and 80 million. Eight injections were given, each causing a distinct reaction, and the result was very satisfactory, the patient making a good recovery.

It is pointed out that the infection was probably contracted in Sicily, when the patient was debilitated by previous malarial attacks; and that the serum reaction varied in degree with different strains of the micrococcus which were tested at the same time. A review of the vaccine treatment used for the disease terminates the paper.

P. W. B-S.

CARONIA (G.). **Nuovi metodi vaccinoterapici nella febbre mediterranea.** —*Pediatria.* 1917. Apr. Vol. 25. No. 4. pp. 199–211. With 5 charts.

The author gives a short resumé of the various forms of treatment that have been used for undulant fever; these have given only moderately good results. As Di CRISTINA and subsequently himself had had very good results with a sero-vaccine for the treatment of typhoid and para-typhoid fevers he was induced to use the same method for this fever. Two forms were prepared: (1) a two to three days growth of several strains of *M. melitensis* was grown on glycerine agar and washed off in normal saline; this was then mixed with a serum strong in amboceptor and agglutinins, the proportions varying with the strength of the emulsion and efficacy of the serum. The mixture was then kept at a temperature of 37° C. for 36 hours. A further supply of serum was then added and incubated for another 36 hours; ½ per cent. phenol was added and the whole gently centrifuged. The fluid was heated to 55° C. for one hour on three days and distributed in capsules. (2) Broth cultures of the organism were used instead of the agar emulsion.

Eight cases were treated varying in age from 2 to 40 years. Very good results were obtained in infants and adults, slight and severe cases, those with acute or chronic course, and whether used early or late. The injections of 1–2 c.c. were given intramuscularly or, if the effect was required more rapidly, by the intravenous method (two cases).

The number of cases was small but from previous experience of other diseases treated by this method of sero-vaccine the author believes that it is the best specific yet introduced for this troublesome disease. Five temperature charts are inserted which show the amounts injected and dates when given.

[This would appear to be a sensitized vaccine from which the serum had not been separated. There is no indication of the strength of the vaccine or serum used, viz., the amount of antigen and antibody contained in each cc.]

P. W. B-S.

VERNONI (Guido). **Febbre melitense da infezione di laboratorio.**—*Malaria e Malat d. Paesi Caldi.* 1916. Sept.-Dec. Vol. 7. No. 5–6. pp. 285–287.

Undulant fever infection contracted while working with the *M. melitensis* in laboratories is well known to be not uncommon both in England and abroad. NICOLLE has recorded four cases at the Institute Pasteur, Tunis, and the author describes one from the laboratory in Bologna. The onset of this case was in May 1915 and the patient did not completely throw off the fever until October, a period of four months, but the course was not severe. He notes that the method of infection was uncertain, possibly through the mouth or through the hands (cutaneous inoculation). The specific agglutinins were very inconstant in amount, reacting up to 1 in 1,200 during pyrexial periods and falling to 1 in 200 in the intervals of normal temperature. The diagnosis was successfully made by haemoculture on the 4th September during a febrile period (a cocco-bacillus was obtained from the clot by TIZZONI's method), this proof being of much greater value than that of the sero-agglutination.

P. W. B-S.

CANELLI (Adolfo F.). **Dell "Agglutinazione paradossa" del** ***Micrococcus melitensis.***—*Pathologica.* 1917. Jan. 15. Vol. 9. No. 196. pp. 23–24.

Paradoxal agglutination reactions have been noticed frequently in dealing with the *M. melitensis*; the author here records some interesting observations. The serum used was that of a definite case taken on three occasions with an interval of about ten days between. The examinations were made within 24 hours both microscopically and macroscopically, using an emulsion of a 24–48 hour culture of a well attested strain of the Micrococcus in ·85 per cent. salt solution. The tubes were kept at 37° C. for one hour, then in the cold for 24 hours before being read off.

Dilution of the Serum.

Date.	1/20	1/40	1/80	1/160	1/320	1/640	1/1280	1/2560	1/5120
Sept. 10	—	—	—	—	++	+++	++		
„ 21	—	—	—	+	++	+++	++	+	+
Oct. 5 unheated..	—	—	—	—	++	+++	++	+	+
„ „ heated to 56° ..	—	—	—	—	+	+++	++	++	+

It is noted that on the third occasion of testing, the blood also gave a strong Wassermann reaction and the patient was treated as a syphilitic subject.

P. W. B-S.

BLANC (Georges). **Enquête sur les chèvres laitières de la Marsa (Tunisie) au sujet de la fièvre méditerranéenne.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 376–377.

Between the 29th Aug. and the 6th Sept., 1916, the author examined 119 goats at Marsa, a little town in the north-east of Tunis, to determine whether they were infected with the *M. melitensis*. Of these 61 were of the Maltese breed, and 56 Arabian. None was found to be infected.

The test employed was agglutination of the blood serum at dilutions of 1/20 and 1/50 with a fluorite emulsion of the *M. melitensis*, as recommended by NICOLLE and GOBERT in 1915. It is noted that there were no cases of undulant fever at the time in the indigenous population.

P. W. B-S.

LEPROSY.

Penna. La lèpre, sa diffusion et sa prophylaxie dans la République Argentine.—*Bull. Office Intern. d'Hyg. Publique.* 1917. Mar. Vol. 9. No. 3. pp. 351–354.

Leprosy has for long existed in Argentina, and in 1778 there were leproseries in the towns of Córdoba, Tucumán, Salta and Santa Fé. It also existed at Montevideo and Corrientes—near the town of Asuncion in Paraguay, an active focus of the disease. Cases are now found in the provinces of Corrientes, Entre Rios, Santa Fé, Buenos Ayres, Chaco, Formosa and Misiones, as well as in the federal capital—and a few others in other parts of the country.

No serious attempt to prevent the migration of lepers from place to place or to establish institutions for their isolation has been made, although a conference on the subject, under Dr. Malleran, was organised by the Government in 1906, or in spite of the efforts of Drs. Malleran, Veyga and the author, who strongly urges the formation of "leproseries" or colonies under enlightened management near the principal leprosy centres.

P. S. Abraham.

Odriozola (Ernesto). Estudio clínico y nosográfico de la lepra. Lección Clínica. [A Clinical Lecture on Leprosy.]—*Cronica Med.* Lima. 1917. Feb. Vol. 34. No. 644. pp. 41–51.

A clinical lecture on leprosy, based on the examination of seven patients, of whom six were Chinese and one a Japanese. The author states that leprosy has not hitherto been recognised as existing in Peru amongst the natives of the country, though foci of the disease undoubtedly exist in the neighbouring Republic of Colombia. All the cases of leprosy hitherto identified in Peru have been amongst Chinese and other Asiatic immigrants. Although no special measures have been taken so far to isolate such cases, there does not seem to have been a single instance on record of the disease having been communicated to any members of the indigenous population. This notwithstanding the fact that the immigration of Asiatics into Peru has been going on for the past 40 years.

J. B. Nias.

Vortisch-van Vloten (H.). Die Aussätzigen in China. [Leprosy in China.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. Mar. Vol. 20. No. 6. pp. 141–147. With 3 photographs.

The author estimates that in China—particularly in Canton and Fukien—there are about one million lepers [but in point of fact there are no data to support this estimate] with only 20 Asylums accommodating about 3,000. The sufferers mix freely with their relatives, who sometimes get rid of bad cases by poisoning or burying alive. They are allowed to wander about by the authorities and to live by begging. Sometimes they congregate in villages.

They have little or no medical care; but in 1914 an Asylum was founded by Dr. Kulme on the river island, Tunkun, containing 258 patients.

P. S. A.

Eichmuller (G.). **Nouvelles remarques à propos de la lèpre en Tunisie.** *Lepra.* 1914. Nov. Vol. 15. No. 1. pp. 1–4.

In this paper the author gives short particulars of 12 cases of leprosy which he has recently met with, and he believes that there are probably many more hidden and undiscovered. Nine of these 12 are of Maltese origin. They are mostly very poor, and free to mix with the healthy population in the pursuit of their precarious livlihood. He believes thoroughly in the spread of leprosy by contagion, and that thus these cases will be the source of others. He strongly urges a new State enquiry in connection with leprosy in the Regency, and thinks that the number of lepers, as given in the estimate of 1907, will be found to be much greater.

P. S. A.

McCoy (George W.). **The Public Health Aspects of Leprosy.**—*Boston Med. & Surg. Jl.* 1917. Jan. 11. Vol. 176. No. 2. pp. 43–48.

This address gives an excellent résumé of the subject. As the author points out, our knowledge of the transmission of the disease is still incomplete, and he maintains that "we are confronted by the fact that the disease is one which we cannot communicate experimentally to animals, nor indeed, for that matter, to man." None of the recent reports of successful inoculations is to him convincing, and from the large experimental experience of himself and his colleagues in Hawaii, he doubts that leprosy has ever been reproduced in animals. He disbelieves also in its transmission by heredity or by insects. Two striking facts of which we have no explanation are: (1) The disease may spread readily enough in one place and not in another, and (2) that practically everywhere the incidence of the disease is 50 per cent. higher among men than among women. A distinction may be drawn between endemic foci where leprosy spreads, and non-infectible areas where cases may occur- imported cases. "From a purely public health standpoint we need concern ourselves but little with cases found in these regions."

The simple anaesthetic cases are of no importance from a sanitary point of view, and the author, while agreeing that lesions from which bacilli are being discharged probably are sources of infection, believes it fallacious to suppose that all open or ulcerative sores in lepers are infective or discharging bacilli.

The questions of diagnosis, prognosis, treatment and sanitary control are shortly discussed.

P. S. A.

Panagiotatos (Aggelikes G.). ΠΑΝΑΓΙΩΤΑΤΟΥ (Αγγελικης Γ.). Ὀλίγα περὶ λέπρας.—[Remarks about Leprosy.] ,, Ιατρικὴ Πρόοδος " & *Grèce Med.* 1916. Aug. 1 & 15; Sept. 1 & 15; Oct. 1 & 15. Vol. 18. Nos. 15–16; 17–18; 19–20. pp. 289–294; 316–322; 347–352.

A lecture on leprosy, chiefly devoted to discussing the relative share taken by inheritance and infection in the propagation of the disease, but also emphasizing the need for isolating and treating cases as they arise. It is stated in the text that the number of lepers in Greece

was estimated at 400 in the year 1887, but no figures are given for any later date. In Crete [? at what date] the number has been estimated at 500. Particulars are given of four cases, illustrating the points brought under review.

J. B. N.

HOPKINS (Ralph). **Early Manifestations of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1917. July. Vol. 70, No. 1. pp. 56–62.

This is a very useful paper. Its object is "to emphasize the very innocent appearance of the early lesions of leprosy, the absence of discomfort caused by them, and the ease with which diagnosis can be made if only care be taken to test for alterations in sensation in suspicious cases"—and to use the microscope. Even in Louisiana, the diagnosis is often missed, and cases are admitted to the Lepers Home of many years standing. All cases should be regarded as suspicious which present macules, nodules, or sensory disturbances.

In Louisiana more whites than negroes give a family history of the disease. Among other points observed by the author are that the pure "nerve type" of the disease is less likely to become "mixed" than the "skin type"; that while skin symptoms often progress unfavourably up to a certain point and then commence to disappear, the nerve cases advance gradually over longer periods of time. In nerve cases there is a loss of "epicritic" before "protopathic" sensation, with the notable exception of pain; the majority show early loss of tactile discrimination, and inability to distinguish between small differences of temperature. In the nerve type loss of sensation may involve large areas; in the skin type it is limited only to the lesion in the skin-macule, nodule or patch. In right-handed nerve cases, the terminal branches of the left ulnar nerve are most frequently affected. The hands and feet are nearly always affected before other parts; complete anaesthesia and motor paralysis are late developments. Palpable enlargements of affected nerves, especially the ulnar, are very characteristic, with early muscular atrophy leading to flexor contractions usually first in the left little finger. Macular lesions varying in number and size are the most constant early skin manifestations in all types of leprosy—mostly of uniform brownish colour in the skin type, and ringed in the nerve type. The latter are more evanescent than the former and may extend into large serpiginous areas with pale atrophic centres. Nodules are earliest seen on exposed surfaces—face and ears and backs of hands—the scalp always free. The acid-fast bacilli can often be found in the nasal secretions, even when search for them in other regions is negative.

P. S. A.

RANSDELL. **Care and Treatment of Persons afflicted with Leprosy. Report of the Committee on Public Health and National Quarantine United States Senate on S. 4086. A Bill to provide for the Care and Treatment of Persons afflicted with Leprosy, and to prevent the Spread of Leprosy in the United States.**—204 pp. 1916. Washington: Government Printing Office.

This important Report gives in full the clauses of the Bill recommended by the Committee to be passed by the U.S. Government,

and the evidence upon which their opinion is based. The main points in the Bill are the establishment of a home for the care and treatment of persons afflicted with leprosy, under the administration of the U.S. Public Health Service, and the compulsory detention therein with care and treatment of persons so afflicted.

The committee consider that for the protection of the public health, the humanitarian treatment of lepers and the furtherance of the scientific study and investigation of the disease, such a home or homes should be provided by Congress. The testimony of the expert witnesses showed that leprosy exists in practically every State of the Union; that it has been present in the United States for a considerable number of years, and that it is increasing. It was further shown that the treatment at present accorded to lepers by the general public is often most inhumane and cruel, and that at present there are only three institutions maintained locally for lepers. The experts were unanimous in stating that the only known means for effectively controlling the spread of leprosy is segregation. The sufferers often wander from State to State and have no place of legal residence, and it is difficult to decide which State should be responsible for their care. From the long incubation period of leprosy, it would be impossible to remand prospective lepers at ports of entry; and from the increasing commercial relations between the United States and leprous countries the importation of the disease is increasingly apt to occur. In consequences of the public fear of leprosy and the inadequate means for their accommodation it is difficult at present to estimate the number of lepers in the United States. The estimates given at the hearing were from 500 to 2,500. The experts believed that with segregation "the further spread of the disease would be completely controlled and the problem solved in a relatively short space of time."

These points and several others relating to the subject are further elaborated by Senator Ransdell, chairman of the committee, in a comprehensive preface.

The evidence of the following authorities on leprosy, many of them of world-wide reputation, is set out in detail:—Dr. ISADOR DYER of New Orleans, Dr. Howard Fox of New York, Dr. H. M. BRACKEN of Minnesota, Dr. Frank H. PARKER (Superintendent Massachusetts' Leper Colony), Dr. Martin F. ENGMAN of Washington, Dr. J. W. McKEAN of Siam, Mr. W. M. DANNER (American Secretary Mission to Lepers), Dr. J. S. FULTON of Maryland, Dr. F. L. HOFFMAN, Dr. W. C. FOWLER of Columbia, Dr. W. C. WOODWARD of Columbia, Dr. George W. McCOY, U.S. Public Health Service, late Director U.S. Leprosy Station, Hawaii, and Dr. W. C. RUCKER, U.S. Public Health Service.

The whole Report constitutes a most valuable mine of information on the subject, and many excellent photographs are included.

Although the experts examined were practically unanimous in recommending compulsory segregation as the only means of combating the leprosy question, most of them had to admit that the disease was really very slightly contagious— far less so in fact than tuberculosis, and that with the exception of certain districts in the Southern States, in the neighbourhood of which leprosy had long been endemic, there was but little evidence of new foci having arisen—in spite of the sporadic occurrence of cases of lepers who had acquired the disease elsewhere or abroad. P. S. A.

HONEIJ (James A.). **Notes on Clinical Observations and Reactions in Leprosy.**—*New Orleans Med. & Surg. Jl.* 1917. July. Vol. 70. No. 1. pp. 5–14.

The author records a number of observations on some 26 cases of leprosy—16 being nodular. In no case could the original mode of infection be traced. The initial lesions or symptoms varied: pain and swelling with the appearance of a small nodule were the first symptoms observed in four cases. In only two were near members of the family affected; five had had syphilis. No evidence regarding the incubation period was obtainable. Scalp lesions occurred in four cases: the oral cavity and larynx were commonly involved, and the intestine not infrequently. Thickening of the arterial walls was absent, and blood pressure was high in only two cases. The average haemoglobin was 69–70 per cent. The knee-jerks were exaggerated in all cases. In most fairly advanced cases the orbital tissues were affected. In spite of the usual inflammation and destruction of the nasal tissues, loss of smell existed in only one case. Polyuria was very frequent with bacilluria. Ulcers of the penis, especially around the orifice, were not uncommon, and orchitis often occurred. Most cases except the early ones were sterile, but menstruation was fairly normal. Bone changes were observed in all cases—especially shown by Roentgenograms. Body lesions usually appeared first on extensor surfaces: the abdomen and back never developed open lesions. The shortest life period—since first symptoms were noticed—was 6 years, the longest 17—the average 10 years and 3 months.

The luetin test tried in six cases was positive in one, in which there was a definite history of syphilis. The Wassermann reaction was positive in the majority of cases. Von Pirquet's test was tried in six cases with good reactions in two.

P. S. A.

LAUTMAN (F.). **Leprosy, with Report of a Case.**—*Urol. & Cutan. Rev.* 1917. St. Louis. Vol. 21. pp 144–147.

The subject of this report was a coloured man aged 33, who had recently come to Hot Springs from the State of Mississippi where he was born. None of his family or associates as far as he knew had been affected. He had had the disease for seven years, but it had never been diagnosed by numerous physicians who had seen him, although it was a very extensive and typical case of nodular leprosy. There was a history of a chancre a year before the "lumps" broke out on his forehead, some appearing on the nose, chin, ears and back of neck, where they have remained ever since. Loss of sensation on the hands and feet was observed two years ago with subsequent development of nodules, and involvement of the mucous membrane of the palate and naso-pharynx and larynx. The Wassermann reaction was positive; and abundant bacilli were easily demonstrated in the lesions.

Good photographs illustrate this paper.

P. S. A.

QUERENS (Percy Lennard). **An Early Case of Leprosy.**—*New Orleans Med. & Surg. Jl.* 1917. Apr. Vol. 69. No. 10. pp. 706–709.

The patient, a Cuban negro, had lived for a year in the same room with a leper until two and a quarter years ago. Three months after leaving, a sensitive bubo developed in one groin—but no venereal condition was present. Two months later small nodules appeared on the face, forehead and ears—gradually increasing in number and size. Later, frequent attacks of epistaxis occurred and soreness of the nasal mucous membrane. On examination the thighs and legs exhibited irregular areas of pigmentation and anaesthesia. The upper extremities were unaffected. Acid-fast bacilli in large numbers were demonstrated in scrapings.

P. S. A.

MORRISSEY (M. J.). **Sporadic Leprosy in Connecticut.**—*New York Med. Jl.* 1917. May 19. Vol. 105. No. 20. (Whole No. 2007.) p. 940.

The patient, a man aged 44, born in Sicily, had lived in Hartford since coming to America 10 years ago. "Tubercles" appeared first on the shins, and later on the face, hands and arms, steadily progressing until the whole body was covered. There were also disturbances of innervation particularly on the forearms. Hansen's bacilli were demonstrated in numbers. The man had been treated by various doctors, mostly for syphilis. He was asked to report to the city hospital for further observation and isolation, and granted 48 hours to set his house in order but departed, it is said, for Italy.

Three sporadic cases of leprosy have been noted in Connecticut in the last three years.

P. S. A.

POWELL (Arthur). **Hypertrophy of the Nipple : A hitherto Undescribed Sign of Leprosy in the Male.** *Brit. Med. Jl.* 1917. May 19. p. 649.

Dr KOHIYAR, who first called attention to this sign, had examined 81 lepers and found both nipples very large in 62 cases, moderately large in 8, large on one side in 2, and both nipples normal in 9. Dr. Powell has made observations in a series of 221 cases: both nipples were enlarged in 167, one nipple enlarged in 7, and nipples not enlarged, 47. Taken together, the two series show about 80 per cent. of enlarged nipples. As a control 200 non-leprous males were examined and in only two— i.e., 1 per cent. - was manifest hypertrophy noted.

P. S. A.

BERCOVITZ (Nathaniel) **The Hypodermic Use of Chaulmoogra Oil in Leprosy. Preliminary Report of Series A.**—*Jl. Amer. Med. Assoc.* 1917. June 30. Vol. 68. No. 26. pp. 1960–1961.

The author reports the result of HEISER's hypodermic treatment in 14 cases of advanced leprosy 6 anaesthetic and 8 mixed and tubercular. The average duration of the disease in these cases was 11 years. The injections were begun with 1 cc. of HEISER's chaulmoogra mixture administered weekly and gradually increased to 3 cc. There was a slight general reaction after the first injection, but none afterwards. The patients were also given sodium bicarbonate baths, and an iron and arsenic pill in alternate weeks. The treatment extended over nine months. There was marked improvement in all the cases: malaise and lack of energy soon decreasing and the general condition improving. In the anaesthetic cases, after six months the anaesthesia diminished, the skin becoming hypersensitive and in one case tactile sensibility returning, and ulcers healing. The tubercular and mixed cases showed earlier improvement with disappearance of the tubercles. There was usually severe pain in the feet and legs and n the previously painless ulcers when the swellings began to disappear – probably owing to the removal of the pressure on the nerves.

Microscopic sections of nodules showed in two cases degeneration of the epithelioid cells, with deposit of fibrous connective tissue. A further series of cases is under treatment and a later report will be issued.

P. S. A.

GHOSH (Sudhamoy). **Report of a Chemical Investigation of Chaulmoogra Oil in Connection with "Leprosy Treatment."**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 691–697.

The author reports a preliminary series of investigations of the different kinds of "chaulmoogra oils" found in India and Burma. The true chaulmoogra, *Teractogenos kurzii*, comes from Burma and Assam; the false chaulmoogra, *Gynocardia odorata*, from Sikkim, Assam and Chittagong; the large chaulmoogra, *Asteriastigma macrocarpa*, from Burma and Madras; the small or grooved chaulmoogra, *Hydnocarpus venenata*, from Burma, Madras and Ceylon. There are also two others *Hydnocarpus Wightiana*, Bombay, and *H. anthelmintica* of Siam.

The fatty acids were extracted by saponification and fractional crystallisation, and sodium salts formed. The attempts at the separation of the individual fatty acids will be continued. Several of the sodium salts prepared from the expressed oils in these experiments have proved too irritating for subcutaneous injection, and much further work on the subject is necessary. It appears that the oil known in Europe as "chaulmoogra oil" has never been obtained from the seeds of *Gynocardia odorata* -the fatty acids of which do not include "gynocardic acid"- hence the so-called "sodium gynocardate" is a misnomer.

P. S. A.

SUGAI (Takekichi). **Zur Chemotherapie der Lepra und der Tuberkulose.**—*Mitt. d. Med. Gesellschaft. z. Tokio.* 1916. Mar. 5. Vol. 30. No. 5. pp. 3–4.

The author has found copper cyanide successful in both leprosy and tuberculosis.

Preliminary experiments were made with tuberculised guinea-pigs and rabbits, by intravenous and intraperitoneal injections. After 8 to 10 injections complete recovery often took place, and post-mortem tubercle bacilli were not to be found.

In consequence of these results, lepers were similarly treated with apparent disappearance of symptoms after six months' to one year's treatment.

P. S. A.

SADI DE BUEN. La morfologia de la sangre en la lepra. [The Morphology of the Blood in Leprosy.]—*Bol. Inst. Nac. Higiene de Alfonso XIII.* 1916. Dec. 31. Vol. 12. No. 48. pp. 227–249. With 4 figs.; and [a résumé] *Siglo Med.* 1917. Feb. 10. Vol. 64. No. 3296. pp. 82–83 & No. 3297. pp. 98–100. With 4 text-figs.

From the examination of the blood of a number of lepers (70) observed at Granada and Malaga in Spain, the author formulates the following conclusions:—

1. There does not exist, in any of the varieties of leprosy, any special leucocytic index of diagnostic value.
2. Eosinophilia is not in any way a characteristic or common sign.
3. Increase in mononuclears is frequent.
4. In some cases of anaesthetic and mixed leprosy, however, an increase may be noted in transition forms of the lymphoid types.
5. Arneth's index is generally deviated to the left.
6. No deductions of importance can be drawn from blood or leucocyte counts.

The author found an excess of polymorphonuclears (over 72 per cent.) in only 14 out of his 70 cases = 20 per cent.; of eosinophiles in 15 = 21·4 per cent.; of mast-cells in 33 per cent., and an increase of transitional forms of lymphocytes in 50 per cent. A blood-count of red cells, in 36 of the patients, gave a mean of slightly over 6 millions per cubic mm., which is, however, attributable to the height of Granada above the sea-level (775 metres).

J. B. N.

CHUJO (S.). [Leprosy Bacilli in the Blood.]—*Hifu Kwa, Hitsu Nyo Ki Kwa Zassi.* 1916. Apr. 30. Vol. 16. No. 4. pp. 16–26. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Jan. Vol. 31. No. 1. pp. 72–73.]

Blood drawn from the arm, 5 cc., diluted with 200 cc. of a 3 per cent. solution of acetic acid, avoiding contact with air, gave 14 positive results in 27 cases. All the tuberculous cases were positive, but only five of the nerve cases. Half of the organisms found were free, and the others inside leucocytes; the intracellular ones were generally not grouped but typical in form, size and staining, the free-lying ones commonly atypical.

P. S. A.

AKAMATZU (Z.). [Histo-Pathological Studies of the Nose in Leprosy.]—*Tokyo Igakukai Zassi.* 1916. Sept. 5. Vol. 30. No. 17. pp. 1–10. [Abstract based upon Review by R. G. MILLS, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 172.]

The author finds that in some cases bacilli in considerable numbers occur in the nasal mucous membrane even when there is no ulceration or visible lesion. They escape through interstices of the epithelium; the apparently intact mucosa really contains numerous infiltrations crowded with bacilli. The infiltrations involving the walls of small blood vessels lead to extravasation of blood and pigmentation.

P. S. A.

Stanziale (Rodolphe). **Nouvelles recherches sur les lésions lepreuses expérimentales de l'œil du lapin. IVe Communication.**—*Lepra.* 1915. May. Vol. 15. No. 2. pp. 63–72. With 1 plate & 3 text figs.

This paper was published in German in the *Centralblatt für Bakteriologie*, in March, 1915, and a short abstract appeared in this *Bulletin*, Vol. 5, p. 186.

The conclusions arrived at from the experiments were: -

1. That the lesions produced experimentally in the eye of the rabbit may be to a certain point reproduced in series by passing the new growth directly from one animal to the other, which shows without doubt the vitality of the germ.
2. That the leprous material, although retaining in the organism of the rabbit its pathological power, becomes temporarily attenuated.
3. That it is possible to isolate from the experimental leprous granulomas of the eye of the rabbit an acid-resistant bacillus which is quite identical with that obtained by Kedrowsky from human lepromas but differs in not showing the same pathogenic power in producing experimental leprous lesions in animals.

P. S. A.

Dubreuilh (W.) & Bargues (A.). **La Lèpre de la Bible.**—*Lepra.* 1914. Nov. Vol. 15. No. 1. pp. 5–15.

The popular belief that " leprosy ", as we know it, is the same disease as the Biblical " Zaraath," which term has been translated as " leprosy " or " lepra " in all modern editions of the Bible since the Septuagint, though long discredited by most leprologists, is still universally held by the public, and largely even by the medical profession.

This very able paper fully discusses the whole question and well explains how the error has arisen. The authors emphasise the fact, well-known to those who are practically acquainted with leprosy, that the chief characters of " Zaraath " as described by the Biblical writers, not only do not coincide with the symptoms of our modern " leprosy," but are in many respects diametrically opposite to them. There is, e.g., no allusion in the Biblical accounts to the characteristic loss of hair, alteration of voice, impairment of vision, local anaesthesias, mutilations of extremities, slow progressive and fatal evolution, etc.

Zaraath was rather an affection or group of affections of rapid course and obviously of ready contagion and curability. [As the Reviewer has elsewhere observed, it is likely that many severe, disfiguring, " unclean " and manifestly contagious diseases of the skin were then included under the general term " Zaraath." In those days there certainly were no means for the accurate diagnosis or differentiation of such diseases.]

When the 70 learned men of Alexandra in 150 B.C. translated the sacred writings into Greek, they rendered the word " Zaraath " into the Greek " lepra," which had at that time the Hippocratic signification of a scaly disease. When true leprosy afterwards attracted attention, it was known among the Greeks by the name " elephantiasis " and not " lepra," which still had the Hippocratic meaning. It was not indeed until the 10th century that the great authority on Arabian medicine, Constantine of Carthage, originated and perpetuated the mistake in his medical writings by wrongly translating the term "djudsam" which was the Arabic name for true leprosy into the word "lepra."

The authors quote the various references to Zaraath in the Bible and Talmud, and refer to all previous writings on the subject. They admit that there is much to be said for the theories of MacEwen and Unna, who regard the term "Zaraath" as implying a taboo rather than a definite malady.

They finally conclude that in the ancient writings of the Old Testament, the word "Zaraath" designated an indeterminable group of contagious cutaneous affections, and that while the Levitical regulations had a medical and hygienic signification, the term later on assumed a rather figurative and moral meaning as seen especially in the Talmud. The confusion of Zaraath with our modern "leprosy" is principally due to the error of the African Constantine, who used for "Elephantiasis grecorum" or true leprosy the word "lepra" which had been employed by Hippocrates and the translators of the Septuagint in a totally different sense. [The reader may be referred to the interesting paper of Dr. D. W. Montgomery on this subject (*Journal of the American Medical Association*, Sept., 1915), shortly abstracted in this *Bulletin*, Vol. 6, p. 401.]

P. S. A.

TROPICAL DISEASES OF THE SKIN.

MARTIN (C. J.). **Observations on the Pathology of Barcoo Rot (Veld Sore ?); with Suggestions as to Treatment.**—*Brit. Med. Jl.* 1917. June 9. pp. 761–762.

The author describes an affection occurring in a number of Anzac soldiers, who had been six months campaigning in the Suez Canal desert, which resembles the "barcoo rot" of Australia and seems to be closely allied to, if not identical with, the "veld sore" of Africa. The first sign is usually a bleb containing thin pus in a slightly inflamed area, and resulting in a shallow, slowly spreading, ulceration. The ulcers are usually multiple and, when healed, glossy areas are left more or less denuded of hairs and glands.

The symptoms and pathological findings have no resemblance to the slowly-evolving leishmaniasis known as "Bouton du Nil," "Clou de Biskra," etc

The author saw 20 cases in an outlying field ambulance with ulcers mostly on the back of the hands and wrists -i.e., in areas exposed to small injuries and rich in hairs. Microscopical examination of hairs from the ulcers and inflamed areolae showed infection with cocci and in three cases diphtheroid bacilli. Cultivations from the hairs and early blebs exhibited a preponderance of *Staphylococcus albus.*

As with the veld sores of Africa, and barcoo rot of Australia, prolonged exposure to insanitary conditions, defective food, etc., seem to be of etiological importance, and the lesions are difficult to heal in those circumstances, but in hospital they generally do well under antiseptic dressings. In view of Lt.-Col. Martin's observations on the primary infection of the hairs, he was led to epilate the hairs in and around the ulcers as early as possible, and soon found that the ulcerative process was quickly stayed.

P. S. Abraham.

HICKINBOTHAM (J. R.). **Treatment of "Barcoo Rot."**—*Brit. Med. Jl.* 1917. June 23. p. 842.

Dr. Hickinbotham in Western Australia found that "barcoo rot" was readily cured by giving 15 grains of pot. nitrate and 15 minims of sp. eth. nitrosi three times daily, with local applications of weak ammoniated mercury ointment. The idea was to get the kidneys to do their proper work.

P. S. A.

MUELLER (O.). **Die Behandlung des tropischen Ringwurms mit künstlicher Höhensonne (Quarzlampe).**—[Treatment of Tropical Ringworm by the Quartz Lamp.] *Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Mar. Vol. 21. No. 6. pp. 101–104. With 2 figs.

In old, advanced cases of "Dhobie itch" the usual remedies, sublimate, iodine, chrysarobin, etc., are not very satisfactory. The author found that in a very advanced and extensive case in a man treatment by artificial quartz-light had an excellent result. He was given in September six exposures of 5 to 15 minutes at a distance of

65 to 40 cm. In October, the duration of the exposures was gradually increased to from 15 to 30 minutes, and the distance diminished to 30 cm.

An erythema was produced and, when this subsided, the ringworm had disappeared, and remained cured for three months while the patient was under observation.

The same treatment had no good result in cases of "Herpes tonsurans."

P. S. A.

DE ALMEIDA (Henrique Moss). **Um fóco epidemico de "Piedra."** [Correspondencia.]—*Brazil Medico.* 1916. Nov. 4. Vol. 30. No. 45. p. 360.

A preliminary note in which the author remarks that the total number of recorded cases of piedra in Brazil up to the present time does not exceed 70. By the kindness of Professor Bruno LOBO, the director of the National Museum, the author has had the opportunity of observing a veritable outbreak of piedra, numbering 48 cases, besides 25 others in the course of improvement. A further account of the outbreak is promised in a forthcoming graduation thesis.

J. B. Nias.

MOSES (Arthur). **Piedra.**—*Brazil Medico.* 1917. May 5. Vol. 31. No. 18. pp. 150–151.

The author was able to identify in 50 successive cases of piedra the *Trichophyton acuminatum* described by HORTA in 1911, in 33 cases in a state of purity, in five in association with *T. Hortai*, and in two with the fungus described by Juhel RENOY. Growths were obtained on maltose-agar. References are not given to these authors' papers.

J. B. N.

DE MAGALHÃES (Octavio.). "*Aleurophora benigna.*" **N. g. n. sp. (Nota prévia).**—*Brazil Medico.* 1916. Nov. 18. Vol. 30. No. 47. pp. 369–370.

In this preliminary note the author describes a new skin-parasite observed by him in five cases. It is said to be common in certain regions of Brazil. The lesion which it causes consists of white, slightly raised patches of limited extent, which are found on the face, chest, arms, or buttocks of the affected individual. They are difficult to see except in a good light, and cause no inconvenience to the patient beyond a slight itching, in this respect resembling the common pityriasis versicolor. There is but little desquamation. A scraping of the skin reveals fungal elements, which lie between the cells of the *stratum corneum.* They do not penetrate more deeply. The best stain to employ is Sahli's blue. The fungus consists of mycelial hyphae and spores, both having a diameter ranging from 2 to 3μ. The cell-wall of the spores is remarkable for its thickness. The author's description is not accompanied by any illustrations, and he does not seem to have made any cultures. On classificatory grounds he proposed to rank the organism as a new genus and new species, under the name of *Aleurophora benigna.*

J. B. N.

BLANC (Georges) & BOUQUET (Henry). **Un cas de Mycétome à *Nocardia Madurae* observé en Tunisie.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 431–435. With 1 plate.

The authors describe a good case of this disease in a native aged 33. In 1913, he injured his right foot which began to swell and to develop numerous protuberances and ulcerations, from which yellow grains exuded. There was no pain even on pressure. Radiographic examination showed extensive decalcification of the bones. In December, 1916, the foot was amputated.

Under the microscope the grains were seen to be made up of the typical filaments of the fungus *Nocardia*. Numerous cultures were made and it was found that growths were poor or retarded in alkaline media. They were especially abundant in potato and infusions of potato. Inoculations in animals proved negative, except in the eye of one rabbit, which showed growth after two months.

It appears to be the first case of this variety of " Madura foot " actually met with in Tunis.

P. S. A.

DO AMARAL (Zephirino). **Um caso de actinomycose cervico-facial tratado pelo iodureto de potassio e neosalvarsan.** [A Case of Actinomycosis of the Face and Neck treated with Iodide of Potassium and Neo-Salvarsan.]—*Ann. Paulist. Med. e Cirurg.* 1915. Aug.-Oct. Vol. 5. Nos. 2, 3 & 4. pp. 138–141. With 1 plate.

A case of actinomycosis in a woman, 25 years of age, affecting the left cheek and submaxillary region of the neck. The details of the case are commonplace. Treatment was commenced with endovenous injections of iodide of potassium in doses first of 10, and afterwards of 20 grammes, daily, together with an external application of iodine ointment. After 15 days of this treatment, as no great improvement took place, an endovenous injection of neosalvarsan (914, Dose III) was given with immediate benefit, a tendency to cicatrisation at once manifesting itself. This improvement not being maintained, however, a second injection was given 16 days after the first one, the administration of the iodide being suspended for three days at the time of injection. Renewed improvement taking place, three more injections of neosalvarsan were given at intervals of 15 or 20 days. During the course of the treatment irrigation of the fistulae with an iodine solution was substituted for the ointment. In the end the case recovered, and the author attributes the good result mainly to the injections of neosalvarsan. It is mentioned incidentally that the patient gave a positive Wassermann reaction.

J. B.-N.

CHALMERS (Albert J.) & PEKKOLA (Waino). **A Sudanese Dermatitis Venenata.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 512–519. With 1 plate.

A European in the Sudan soon after handling a species of rue (*Haplophyllum tuberculatum*) was attacked by an erythematous swelling on the hands together with reddish spots on the chest, the eruption spontaneously disappearing in three or four days. On a subsequent occasion, having to work among abundant growths of the same plant, and this time wearing shoes and not high boots, not only were the hands affected, but the feet and legs above the shoes, the irritation and eruption starting in about 30 hours. Later on, the lips, eyelids and ears became involved and spots appeared on the chest. Soon after the eruption appeared, he complained of headache, epigastric pain and loss of appetite but no fever. He continued his work among the rue for eight days, and his condition became worse, with swollen glands, etc. On leaving the district all symptoms gradually subsided without medical treatment.

The authors considered that this was a case of Dermatitis venenata, and their opinion was confirmed by a subsequent experiment: rubbing into the patient's skin some leaves and flowers of the plant and producing the same lesions.

A full account of the plant and of its properties is given.

P. S. A.

i. KERSTEN (H. E.). **Ueber Ulcus tropicum in Deutsch-Neuguinea.**—*Arch. f. Schiffs- u. Trop.-Hyg.* 1916. June. Vol. 20. No. 12. pp. 274–284.

ii. HALLENBERGER. **Einige Bemerkungen zu der Arbeit Dr. Kerstens "Ueber Ulcus tropicum in Deutsch-Neuguinea."**—*Ibid.* 1916. No. 19. pp. 439–442. With 1 text fig.

iii. KERSTEN (H. E.). **Zur Arbeit Hallenbergers: Einige Bemerkungen zur der Arbeit Dr. Kerstens "Ueber Ulcus tropicum in Deutsch-Neuguinea."** *Ibid.* 1917. Jan. Vol. 21. No. 2. pp. 30–31.

iv. KUELZ (L.). **Ueber die Identität des Ulcus tropicum Afrikas und der Südsee.**—*Ibid.* Mar. No. 6. pp. 105–109.

i. The author observes that Ulcus tropicum is more virulent in some parts of New Guinea than in others. It is particularly virulent in Rabaul. He made several experiments on the treatment of the disease with neosalvarsan and found that it had no effect in curing it, although the spirochaetes and fusiform bacilli disappeared sooner from the lesions. He, therefore, believes that these organisms are not the cause of the affection in Rabaul. In a number of the cases he found a diplococcus which he thinks may be aetiologically connected with the ulcerations.

His main conclusions are: that the Ulcus tropicum of Africa and German New Guinea appear to be different affections, the former being favourably influenced by salvarsan; that the virulence of the disease depends upon the soil; that the excitant is not yet discovered, and that Balsam of Peru is the most efficacious treatment.

ii. With reference to KERSTEN'S conclusions, the author thinks that the Wassermann test should be used, and that a negative salvarsan therapy is not enough to establish a different etiology. The *Spirochaeta schaudinni* and fusiform bacilli are regularly found in both cases.

He believes that the diplococci are just parasites, probably not reaching deeply in the tissues and not of etiological importance, while the fusiform bacilli may act as excitants and prepare the way for the spirochaetes.

iii. The question whether the diplococci are the excitants of tropical ulcer, in the author's opinion, needs further research. He does not think that much stress should be laid on the Wassermann reaction in New Guinea since "yaws" largely prevails there. He still maintains that the Africa and New Guinea ulcers are different affections in spite of their clinical resemblances.

iv. Kuelz considers that there are differences as well as resemblances between the African and South Sea ulcers, the latter being more severe, more spreading, mutilating and fatal These differences are chiefly due to the weaker physical constitution of the South Sea natives. A positive Wassermann reaction would confirm the identity, but the author thinks that much reliance cannot be placed upon it, any more than upon KERSTEN'S salvarsan experiments. He does not believe with HALLENBERGER that the carrier of the disease is an insect, but that the infection enters through superficial wounds or injuries to the skin, generally of the lower limbs. To sum up, he considers that the two ulcers are identical affections, but that their clinical course is more malignantly influenced by the constitution of the natives and possibly through a mixed affection, as yet insufficiently proved.

P. S. A.

BEJARANO (Jorge). **Fagedenismo tropical y su tratamiento.** [Tropical Ulcer and its Treatment.]—*Repertorio de Med. y Cirug.* 1917. Feb. Vol. 8. No. 5. (No. 89). pp. 196–200.

The author recommends the following treatment for tropical ulcer of the legs:

Wash the surface of the sore for three days in succession with a solution of permanganate of potash in a strength of 1 in 2,000. This is better than the application of solid permanganate in crystals, as recommended by BLUMM and FINK, as it causes no pain. The surface of the sore is then covered with a thin layer of the following ointment, renewed every day after washing with the permanganate solution.

Nitrate of silver in crystals ..	10 centigrammes.
Balsam of Peru	2 grammes.
Oxide of zinc	4 grammes.
Yellow vaseline	30 grammes.

Over the ointment is placed a thin covering of gauze, or cotton-wool, which is kept in place by a bandage.

Sores treated in this way are, as a rule, healed in a month at the outside. Should the cure seem to hang fire, the quantity of nitrate of silver may be increased to 20 centigrammes, and the bandage should be replaced by strips of plaster, in order to prevent the adhesion of granulations to the dressing. The author has treated in this way more than 20 cases with success.

J. B. N.

MEBANE (Tom S.). **Leg Ulcers in Panama—Their Etiology and Treatment.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. Jan.-June. Vol. 9. Pt. 1. pp. 148–151.

Of the leg ulcers met with by the author in Panama, the chief causes were syphilis, trauma with infection, and unciniarias. The patients were mostly West Indian negroes and natives with negro blood. Those cases due to uncinariasis were not directly caused by the hookworm but rather to be put down to the associated anaemia lowering the resistance. In treatment it was important to remove the underlying condition, e.g., intensive mercurial treatment in syphilitic cases, getting rid of the hookworm by chenopodium in the uncinariasis cases and treating the anaemia by iron and arsenic. Locally, continuous wet dressings—1 in 5,000 to 10,000 bichloride solutions— were found more efficacious than ointments and, when clean, strapping the small ulcers, and skin grafting the larger ones after excision. Full details of the treatment are given.

P. S. A.

LOW (George C.) & NEWHAM (H. B.). **A Case of Ulcerating Granuloma Refractory to Intravenous Injections of Antimony, X-Rays, and Other Forms of Treatment.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Apr. Vol. 10. No. 6. pp. 109–113.

A case of ulcerating granuloma successfully treated by intravenous injections of antimony was recorded by the authors in 1916 [this *Bulletin* Vol. 9. p. 209], and they are to be congratulated on publishing this second case which had not a similar good result for, as they remark, "failures in treatment are so often passed over without anything being said about them."

A white man had been on the Congo for 31 months, and acquired there a soft sore on the penis, followed by a bubo and extensive ulceration in the groin; "606" and injections of mercury had no effect in stopping the extending ulceration, and after four months specific treatment he was sent home, where he was treated by scraping and escharotics—with no benefit. He was then sent to the London School of Tropical Medicine and intravenous injection of antimony tartaratum administered—in all 114½ grs. between August 1916 and February 1917. Distinct improvement followed the first injection, but the condition became resistant and further extensions of the ulceration took place, so that when he left the hospital he was even worse than when he entered. X-Rays—four exposures, vaccines, many kinds of local treatment and finally galyl and pot. iodide were tried, but all without effect.

Many different bacterial organisms were present similar to those described by DONOVAN, CARTER, CLELAND and WISE, as well as the *Calymmatobacterium granulomatis* of ARAGAO and VIANNA. Whether these are the real agents remains to be proved; their presence, however, confirmed the diagnosis.

P. S. A.

RANGACHARY (S.). **Ulcerating Granuloma of the Pudenda.** [Correspondence.]—*Indian Med. Gaz.* 1917. Feb. Vol. 52. No. 2. p. 75.

Dr. S. Rangachary records two cases of ulcerating granuloma successfully treated by intravenous injections of antimony tartarate, in each case two injections of 1 grain in 2 ounces of distilled water at intervals of about a week.

P. S. A.

DA MATTA (Alfredo A.). **Emeticotherapia endovenosa no granuloma ulceroso.** [A Case of Granuloma Venereum treated by Endovenous Injections of Tartar Emetic.]—*Brazil Medico.* 1916. Nov. 25. Vol. 30. No. 48. pp. 378–379.

A report of a single case of Granuloma venereum successfully treated by VIANNA'S method. Eighteen injections in all were given with a completely successful result, the initial dose of tartar emetic being 6 centigrammes, rising to one decigramme. The case is the first reported from Manaos.

J. B. N.

BONNE (C.). **Three Cases of Venereal Granuloma treated with Tartar Emetic.**—*Jl. Trop. Med. & Hyg.* 1917. May 15. Vol. 20. No. 10. p. 109.

The author records three cases of granuloma of the pudenda in Surinam treated successfully by intravenous injections of tartar emetic. Hitherto treatment by excision or caustics has been ineffectual, the ulcerations usually re-appearing. The first case, a woman with extensive inoperable lesions involving the vagina and rectum, received 10 injections, at intervals of four to seven days, containing 60 at first and then 150 mgm. in 60 to 150 c.c. of normal saline. The condition improved after the fourth injection and after the tenth the granulomatous tissue was replaced by healthy epithelium.

The second, a man, also a very bad case, required 14 injections with doses increasing to 200 mgm. (3 grains) to effect the cure. The third, a man with a relatively small patch in the left inguinal region, only required four injections.

The possibility of relapses after this treatment, started by BEAUREPAIRE, ARAGAO and VIANNA in Brazil in 1913, is of course not yet known.

P. S. A

TURKHUD (D. A.). **Gangosa.**—*Indian Med. Gaz.* 1917. Feb. Vol. 52. No. 2. pp. 53–58. With 1 plate.

The author, in this excellent and comprehensive paper, describes a case of gangosa in a Hindoo female aged 40, who had been supposed to be suffering from leprosy and was sent to the Matunga Asylum. Her disease commenced with sore throat and ulcerated palate three years ago, the ulceration extending, perforating the hard palate and destroying the nasal cartilages and bones. The skin of the forehead, cheeks and upper lip showed a peculiar wrinkled and atrophic condition. No bacilli or other signs or lesions of leprosy could be found, and although the Wassermann reaction was positive, no spirochaetes or other evidence of syphilis were discovered; with the exception of the nasopharyngeal lesions, the patient was perfectly healthy. It is probably the first case described in India.

The question of the diagnosis of the disease from syphilis, yaws, leprosy, leishmaniasis and tubercle is fully discussed and the views of practically all writers on the subject are given. The belief that gangosa is a disease by itself seems to be gaining ground; but, as the author says, this conclusion has been arrived at chiefly by a process of exclusion, and he thinks that the problem needs further investigation.

P. S. A.

HARPER (Philip) & LYNCH (G. W. A.). **The Etiology of Gangosa and Allied Conditions.** [Correspondence.]—*Lancet.* 1917. June 9. p. 893.

Referring to Dr. BREINL'S observations on gangosa and his view that it is a separate disease due to the organism he names *Cryptococcus mutilans*, the authors point out that these conditions are common in Fiji, both among the natives, and sometimes in Indians and Europeans who have long resided there, and that they are always preceded by primary or secondary yaws, yielding to the same remedies as other forms of tertiary yaws. Medical men in Fiji having a large experience of yaws invariably regard these manifestations as tertiary stages of framboesia.

P. S. A.

GRAY (Charles Perley). **Larva Migrans on the Mexican Border.**—*New York Med. Jl.* 1917. July 7. Vol. 106. No. 1. Whole No. 2014. pp. 15–16. With 2 figs.

The author records an outbreak of an itchy vesicular eruption occurring in a large number of soldiers encamped in a "coral" full of horse-dung, and infected with flies. He considered it to be "undoubtedly due to the larva migrans from the bot-fly," although the evidence he adduces is not convincing. His description of the eruption does not tally with the "creeping eruption" due to the burrowing of an *Oestrus* larva as originally described by Dr. Walter SMITH in 1880, and by the present reviewer in 1882. He states that a "tiny furrow" could be seen to spread from a vesicle for about an inch and then to form a new vesicle, but that no parasite could be found in the lesions, macroscopically or microscopically; only once could anything be detected and then the pathologist was not sure whether it was not extraneous matter; it was thread-like with something "like a lobster's claw at the end," certainly not like the larva of an Oestrus. The only effective treatment was the application of pure phenol.

P. S. A.

HORTA (Parreiras). **Um caso de "larva migrans" com varias galerias.** [A Case of "Larva Migrans" with Multiple Tunnels.]—*Brazil Medico.* 1917. May 19. Vol. 31. No. 20. pp. 167–168. With 1 text fig.

The case was one of a woman, who presented on the right hand an inflammatory condition, consisting of vesicles on the skin intermixed with raised sinuous tunnels containing a white liquid. The itching was extreme, and the daily progress of the tunnels could be measured by the eye. A number of them were slit up by the author in the expectation of finding larvae of *Gastrophilus* or "*Dolichopodideas*," as the patient admitted that she had been handling fresh manure in making hot-beds for her garden. No larvae of any sort, however, could be found. The lesions were treated with compresses of iced boracic acid lotion, which quickly relieved the pain and cured the condition. The character of the lesions is well shown in a photograph.

J. B. N.

Leger (André). Sur l'existence d'une éosinophilie locale dans le Larbish ou Oerbiss des Ouoloffs.—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 294–298.

" Larbish " is a skin affection long known in Senegal and sometimes seen in Europeans, especially in the rainy season. As it superficially resembles a " linear creeping myiasis," it was thought to be in that category and due to a migrating Oestrus larva, but according to Roubaud that theory must be set aside for the view that the affection is due to a microscopic parasite circulating beneath the epidermis. The author has examined three cases in Europeans at Dakar, and especially studied the blood obtained from the lesions, as well as from other parts not affected in the patients. The microscope revealed in all cases comparatively few microbes in proportion to the cytological reaction, but a very large increase in the eosinophile corpuscles in the cutaneous ridges and neighbourhood, while their number was normal in the unaffected parts.

The author does not describe the microbes he mentions.

P. S. A.

Pijper (A.). A Note on the Aetiology of Craw-Craw.—*Med. Jl. S. Africa.* 1917. Jan. Vol. 12. No. 6. pp. 92–93. With 2 figs.

The author has microscopically examined papules from a case of craw-craw in a Kaffir. One successful culture in glucose broth was obtained, the growth consisting of bacilli similar in size, form and staining characters to diphtheria bacilli. He believes that the microorganism is a " coryne-bacterium," and that it is probably the cause of " craw-craw." Injections in rabbit's skin produced nodular ephithelial swellings in 7 to 14 days. He hopes to continue the investigations.

P. S. A.

Bauvallet (H.). Craw-craw et dermo-épidermite microbienne. Analogies. Traitement.—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 137–143.

The ill-defined dermatosis known as " Craw-craw " in West Africa and characterised by pruriginous papules changing into vesicular pustules and ultimate ulcerations is in the author's opinion a " microbic dermo-epidermatitis," having the same début, evolution, morphology, localisation and chronicity, as well as yielding to the same treatment recommended by Dr. Gougerot. The author himself was a sufferer from the complaint and was cured by Dr. Gougerot, whose methods he details in this paper. The main points are to avoid warm, moist dressings with cotton or wool, and to substitute pastes for impermeable vaseline ointments. He begins by spraying the ulcers with a weak resorcin solution—·5 to 1 per cent., then " cauterisation " by solution of silver nitrate followed by the application of a zinc pencil, and for a few days a paste containing yellow oxide of mercury. Finally a complicated antiseptic paste, known as " Baume Duret " is used in varying strengths. The composition of the various pastes is given. A cure may be expected in most cases in 20 days.

P. S. A.

JUPE (F. I. M.). **Brief Notes on a Case of Sarcoma of the Orbit, and Two Other Cases of Medical Interest.**—*Report of the Accra Laboratory* for 1915. pp. 45–46. With 1 plate.

The author briefly describes a raised, pigmented, warty-looking, painful growth on the foot and leg of a native. He observes that "the only disease at all resembling this condition, of which I have seen a description, is the affection called 'Mossy foot,' which, according to Thomas, is fairly common in the Amazon." Under atoxyl and unguentum picis, and antiseptic dressings for ulcers which subsequently developed on the calf, the condition improved. He had previously seen on the Gold Coast four similar but less extensive cases. No microscopical examinations could be made, and from the meagre account given no definite diagnosis is possible.

P. S. A.

RUIZ-ARNAU (R.). **Recurrent Acrodermatosis of Warm Countries.**—*Med. Record.* 1916. Oct. 14. Vol. 90. No. 16. Whole No. 2397. pp. 677–679.

As far as one can gather from the description, although no cultural details are given, the lesions described are probably due to staphylococcic or streptococcic infections, and are apparently identical with the impetiginous affections of the hands and feet and other parts, so common in other than tropical countries, especially in poor children living under insanitary conditions.

P. S. A.

LAWRENCE (Herman). **On a Skin Eruption associated with the Presence of Great Numbers of** *Demodex folliculorum.*—*Med. Jl. Australia.* 1916. Dec. 30. Vol. 2. 3rd Year. No. 27. pp. 555–556. With 1 text fig.

The author describes an affection occurring chiefly in adults resembling Impetigo contagiosum and associated with enormous numbers of the *Demodex folliculorum.* He observes that for many years he had entertained increasing doubts as to the entirely harmless nature of the Demodex in human beings, and he suggests that it may be etiologically connected with the cases he has recently examined. He gives a summary of the literature of the subject since the first observations of HENLE in 1841 and SIMON in 1842, and emphasises the fact that there is no doubt of the parasite being the cause of a skin affection in dogs and more rarely in other animals.

[The reviewer can to some extent corroborate the views of Dr. Herman Lawrence. He has frequently found the acari so numerous in certain cases of acne that he also has been inclined to believe that they must have some causal effect.]

P. S. A.

CHALMERS (Albert J.) & ATIYAH (Selim). **Acanthokeratodermia praecornufaciens.**—*Jl. Trop. Med. & Hyg.* 1917. Feb. 1 & 15. Vol. 20. Nos. 3, 4. pp. 25–28, 37–40. With 4 plates.

Dr. Chalmers employs the term "acanthokeratodermia" to include "hyperkeratoses" accompanied with "acanthosis," and in this paper the affection is dealt with in his usual thorough manner, based upon the case of a native of the Sudan, aged about 30, who had suffered since early childhood. The condition in this man was recognised by Dr. CHRISTY as identical with "Karondo" of the Congo and Uganda. It consists of thickened areas of epidermis, which may break down, or become fissured, chiefly affecting the soles and palms, and often accompanied with Hyperkeratosis subungualis.

Cases of more or less similar character which have been previously recorded are referred to by the authors, and an elaborate description is given of the pathological histology of the lesions. One point of interest is that the enormously thickened horny layer is not merely hypertrophied but is largely composed of cornified and modified prickle cells.

A scheme of classification of the "hyperkeratoses" is given, together with an excellent series of photographs.

P. S. A.

CHALMERS (Albert J.) & KAMAR (A.). **Keratodermia punctata.**—*Jl. Trop. Med. & Hyg.* 1917. June 1. Vol. 20. No. 11. pp. 121–127. With 4 plates.

The authors describe the case of an Arab woman who had been affected for eight or nine months with an itchy condition of the palms and ventral aspects of the fingers, which presented a numerously pitted appearance. When examined with a lens, heaped up horny collections surrounded the orifices of sweat ducts, as well as corn-like masses which coming away leave the pit-like depressions. Numerous sections microscopically examined showed that the affection is a Keratodermia with lesions somewhat similar to those of arsenical keratosis but not of arsenical etiology, although it may be due to irritation through the sweat ducts by substances absorbed from the alimentary canal or from some metabolic changes in the body.

The whole question is fully discussed in this important paper and extensively illustrated.

P. S. A.

VAN DEN BRANDEN (F.). **Chéloïdes géantes chez une négresse.**—*Bull. Soc. Path. Exot.* 1917. Jan. Vol. 10. No. 1. pp. 39–40. With 1 plate.

The author describes the case of a woman, aged 24, from the Belgian Congo, with eight extensive cheloid growths, which had appeared seven years previously, attaining their present size in three or four months. One very large one occupied the greater part of the back and shoulders, the others being situated over the sternum, the right shoulder-joint, the right side of the body, the right upper arm, and smaller ones on the forearms and left calf. At their first appearance they were intensely pruritic, but this diminished as the tumours grew. The lesions are well seen in the accompanying photographs.

P. S. A.

MEDICAL MISSIONS IN INDIA. 1917. Apr. Vol. 23. No. 89. pp. 14–24.
Symposium: Skin Diseases.

Information was asked for in reference (1) to the proportion of skin diseases in the Dispensaries, (2) the most prevalent skin diseases, and (3) their treatment. The reports had not all come in.

Dr. A. E. MOORE, Palwal, reports that excluding ulcers, skin cases form 7½ per cent. of the attendances; the three commonest diseases are (1) the so-called "Dad" or Tinea marginata, (2) eczema and (3) ? Delhi boil. At Kalna, Dr. PRABHAKER estimates the skin cases at 3·2 per cent.; (1) "Ringworm"; (2) Scabies, and (3) a pyogenic affection chiefly confined to the legs. Dr. R. MORISON, Naogaon, estimates skin diseases at 10 per cent.: (1) scabies, (2) tinea, and (3) eczema. Dr. Minnie GOMERY, Kashmir, states that favus, scabies and eczema are very common. Dr. Lillie DUNN gives nearly 9 per cent. of skin cases: (1) scabies, (2) tinea and (3) eczema. Dr. J. M. MACPHAIL, Bamdah, estimates skin diseases a little over 10 per cent.: (1) scabies, (2) ringworm, and (3) eczema. Dr. AMBROSE, Pandharpur, gives 20 per cent. of skin cases, the most frequent being (1) scabies, (2) impetigo, and (3) eczema. Dr. R. GOHEEN, Vengurla, gives 3½ per cent.: (1) scabies, (2) Dhobie's itch, (3) eczema. Dr. R. J. ASHTON, Kachwa, states that the commonest skin diseases are (1) tinea, (2) scabies, and (3) eczema. Dr. H. W. KIRBY, Assam, gives 20 per cent.: (1) ringworm, (2) scabies, and (3) ulcers. Dr. Caleb DAVIES, Sarenga, gives 7 per cent.: (1) Dhobie's itch, (2) scabies, and (3) eczema and pseudo-leucodermic patches—?early leprosy— in about equal numbers. Dr. Jessie GRAY, Nasik, gives about 20 per cent.: (1) scabies, (2) eczema, and (3) "specific."

The reporters all give their methods of treatment with the usual well known remedies.

P. S. A.

YELLOW FEVER.

CARTER (H. R.). **Spontaneous Disappearance of Yellow Fever from Failure of the Human Host.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. June. Vol. 10. No. 7. pp. 119–129.

On the assumption that one attack of yellow fever confers permanent immunity the presence, by immigration or birth, of susceptible people is necessary for the continuation of the disease in a community. The effect of adult immigration is greater than that of infant birth on account of the greater mobility of adults. A number of towns are mentioned, from which yellow fever has vanished in spite of the fact that no sanitary work has been done and that Stegomyia is still abundant.

"For yellow fever to disappear, to disappear completely, from isolated communities of small or moderate size *is the rule*, and that, without sanitary work or diminution of Stegomyia. The writer would explain this by the lack of susceptible people sufficient to continue the life of the parasite– the 'failure of the human host.'" He points out that while his explanation depends upon the doctrine that one attack confers immunity, this immunity is not necessarily permanent, though he believes it to be so. The frequency with which yellow fever has disappeared in the absence of immigration is held to be evidence against recurrent attacks. Large towns, such as Havana, in which the disease did not die out spontaneously, have always had a considerable influx of susceptible persons. The author considers that recurrent outbreaks are to be ascribed only exceptionally to the existence of a "larval" form of the disease, but are due to reinfection from without.

E. J. Wyler.

GUTHRIE (Marshall C.). **The Isthmus and Yellow Fever.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. Jan.-June. Vol. 9. Pt. 1. pp. 53–58.

A short account of the history of yellow fever on the Isthmus of Panama.

Until the year 1881, when the first detachment of the French Canal workers arrived at Colon, the facts are clouded in obscurity. The reader is cognisant of the subsequent epidemiological course of events.

The last case occurred in December 1905, since when eleven cases have been imported (six from Guayaquil, Ecuador; one from Cartagena, Colombia; four from Buenaventura, Colombia). Ten of these were detected and stopped at quarantine; the eleventh got through by means of false affidavits, but was isolated and no secondary cases resulted.

E. J. W.

i. HOEY (Matthew J.). **The Practical Application of Maritime Quarantine Measures with Special Reference to Yellow Fever and Specific Reference to Cases of this Disease received at Balboa Quarantine.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. Jan.-June. Vol. 9. Pt. 1. pp. 59–64.

ii. CONNOR (Roland C.). **Clinical Diagnosis of Yellow Fever, with Notes of Symptoms presented by Four Cases of the Disease treated in Ancon Hospital during October and December, 1915.**—*Ibid.* pp. 65–77. With 5 charts.

iii. CLARK (Herbert C.). **A Pathological Report on Recent Cases of Yellow Fever in Panama, including a Differential Diagnosis of Other Diseases showing Jaundice.**—*Ibid.* pp. 80–88.

These three papers deal respectively with the epidemiological, clinical, and pathological aspects of four cases of yellow fever imported from Buenaventura, Colombia, to the Canal Zone.

i. The author mentions an existing epidemic of yellow fever in the north-western part of Colombia, chiefly in the port of Buenaventura [the publication containing his paper is dated January–June, 1916]. It probably commenced in September, 1915, the introduction of the disease being primarily effected, it is thought, by movements of troops (practically all of whom were non-immunes) through Guayaquil, an active yellow fever focus.

"It has been the policy of the Canal government to maintain a protective minimum quarantine of six days against all ports on the west coast of Central and South America. In the case of plague-infected ports, or plague-suspected ports, this period is increased to seven days. This period is reckoned, for the purpose of yellow-fever quarantine, from the time of sailing, in the case of ships from ports where proper outgoing quarantine measures have been enforced and certified under the supervision of an officer of the United States Public Health Service or from ports where the anchorage is considered outside the mosquito-flight zone and there has been no shore liberty granted the members of the crew. In the latter case, quarantine is enforced against only those who may have been exposed to infection, namely, the passengers and such of the crew as have been ashore, the theory being that the ship, under these circumstances, cannot have become mosquito-infected. All detained persons are removed to the quarantine station and complete their incubation period under observation. Temperatures are recorded twice daily; any elevation of temperature above normal is followed by complete isolation and treatment until the temperature again becomes normal. If the cause of the pyrexia cannot be readily determined, the case is considered suspicious and must be passed upon by the diagnosis board.

"Under this system it is thought that it is impossible for yellow fever cases, even the mildest ones, to enter the country, even if a diagnosis is not made."

In the case of the Colombian ports, out-going quarantine is non-existent, but it is believed that the measures above outlined will prevent the introduction of the disease.

ii. The four cases are described in detail. They present no unusual features except that in all, marked dysenteric symptoms were noted by the writer of paper (i), while in one, a woman who had aborted seven days previously, the symptoms were masked by general abdominal tenderness and severe diarrhoea and tenesmus. In three of the cases the diagnosis was confirmed by post-mortem examination. The fourth recovered.

Charts of temperature and pulse curves illustrate three of the cases. Out of 144 cases admitted to Ancon hospital from 1904 to 1915 with a diagnosis of yellow fever, 49 deaths occurred (=34 per cent.). Twenty-four of the fatal cases were complicated by malaria. "Fifty per cent. of all yellow fever admissions had positive blood for malaria. In only one death did the autopsy ascribe the death as possibly due to malaria."

iii. This paper gives in detail the autopsy reports of three of the cases. They present the usual group of findings associated with the disease. In discussing the differential post-mortem diagnosis between yellow fever and haemoglobinuric fever in which death occurred in the post-haemoglobinuric stage the writer states that in the latter disease bile-inspissation is constant and far more marked than in yellow fever, and anaemia is always severe. While the fatty change in the middle and peripheral zones of the liver lobules is more constantly and markedly present in yellow fever than in other acute infections this change may occur in other well-established acute infections to such a confusing extent that the author would not feel justified in making a diagnosis of yellow fever on the basis of this feature alone. This lesion may sometimes be marked in blackwater fever.

Enlargement of the liver and spleen is less marked in yellow fever than in some of the commoner acute infections. The following table illustrates this and also the incidence of jaundice.

Average Weight of the Organs in Grams.

	Brain.	Liver.	Kidneys.	Spleen.	Heart.	Lungs.	Number cases.	Cases jaundiced.
Pneumonia .	1,285	2,045	400	390	322	..	234	103
Blackwater fever ..	1,338	1,818	377	556	301	1,070	35	29
Yellow fever	1,445	1,352	315	177	328	802	3	3
Normal ..	1,300	1,600	300	170	300	750	..	..

It is to be noted that the yellow fever weights in the above table are slightly underestimated, as in one of the cases (out of a total of three) the viscera were atrophic. Jaundice is more or less frequently associated with other acute infections of common origin. Thus in 234 autopsy records of pneumonia, its presence is noted in 103.

The cause of jaundice in yellow fever is discussed as follows :-

> "A common explanation of the cause of jaundice in yellow fever is based on the fact that the liver cells swell and cause obstruction of the bile capillaries and a consequent inspissation of the bile. If this causes the jaundice then the more marked swelling and enlargement of the liver of pneumonia should always be associated with jaundice and the atrophy in acute yellow atrophy should never be associated with jaundice. Such circumstances do not support the old explanation for the occurrence of jaundice in yellow fever and other acute infections. The late experimental work* directed towards solving the cause of jaundice in these conditions

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*HOOPER, C. W. and WHIPPLE, G. H. Icterus—A Rapid Change of Hemoglobin to Bile Pigment in the Pleural and Peritoneal Cavities.—*Jour. Exper. Med.*, January 1st, 1916 pp. 137-147.

has already proved that not only the endothelial surface of the liver but the same surfaces throughout the rest of the body can change liberated hemoglobin into bile pigment and thus produce jaundice. It has even been experimentally produced in a circulation confined to the head, neck, and thorax. This excluded direct liver participation. In conditions such as blackwater fever where much hemoglobin is liberated the late work seems to justify the presence of jaundice but in those infections which do not liberate great quantities, such as pneumonia and yellow fever, the result is not explained. It would seem for some reason to depend on endothelial degeneration, for the more advanced this lesion becomes the more constant is the association of jaundice."

E. J. W.

GUITERAS (Juan). **Recientes observaciones sobre la fiebre amarilla.** [Recent Observations on Yellow Fever.]—*Repertorio de Med. y Cirug.* 1917. Mar. Vol. 8. No. 6. (No. 90.) pp. 265–279. Reprint from *Bol. Asoc. Méd. de Puerto Rico.* 1916. Dec. Vol. 10. No. 113. pp. 185–196.

An informal address, given to the Medical Society of the Northern District of Puerto Rico by the author, on his return from a journey to Central America with the Rockefeller Mission. The principal points made are:—(1) That the author dissents from the conclusions of MARCHOUX of Martinique as to the existence of a specially attenuated variety of yellow fever, which never merges or develops into the severer form. In the author's experience light and severe forms of yellow fever are always found together, and are due to the same infection. (2) The Commission found that in many so-called foci of yellow fever the disease was not really yellow fever, but something else as, for example, a pernicious form of malaria. Even where no particular precautions have been taken to destroy Calopus mosquitoes, the testimony of local physicians in Central America is that yellow fever is dying out, owing to quarantine measures being better enforced. This has happened, for example, at Caracas and Maracaibo. (3) The purgative treatment of yellow fever, formerly in general use, is dying out everywhere, owing to better conceptions as to the real pathology of the disease.

J. B. Nias.

AGRAMONTE (Aristides). **A Review of the Present Yellow-Fever Situation.**—*San. y Benefic. Bol. Ofic.* 1916. Jan.-Mar. Vol. 15. No. 1–3. pp. 133–140.

This paper, which the author was asked to contribute, reviews the then existing epidemiological aspect of yellow fever.

The following are points of interest:—

In speaking of geographical distribution in America it is stated that

"Cuba and the Mexican Gulf ports have been free for many years, as well as the Isthmus of Panama and the West Indies, where no cases at all have been recorded for two years.

"During the first half of the present year (1915), yellow fever in America has been confined to a part of the Mexican republic, probably kept alive by the movement of troops, that is, by the renewal of nonimmune element in the endemic areas, mainly in the peninsula of Yucatan. Sporadic cases, or cases at long intervals, without a clear history as to their source, have appeared from time to time at the places shown in the following table :—

"Yellow fever cases reported in 1915. (U.S. Public Health Service).

Brazil, Bahia, February to July	5 cases.
Ecuador, Guayaquil, February to April	6 cases.
Mexico, Mérida, up to April 10th	4 cases.
Total	15 cases."

Under "Dissemination of Yellow Fever" the author remarks that at the last International Medical Congress held in London (1913) when the danger of the opening of the Panama Canal as regards the possibility of transmission of the disease to Asia was under discussion he "took occasion to point out then, as it has been proven by the time elapsed, how, instead of a danger, the Canal Zone was in fact a sanitary bulwark, or at least a veritable filter through which neither yellow fever nor any quarantinable disease could pass, for I was convinced that the United States Government would necessarily maintain there the wonderful sanitary control established during the period of its construction."

Under "International Prophylaxis" emphasis is laid on the improved conditions in what were formerly endemic foci, such as the towns of Havana and Veracruz, and the possible modification of quarantine in relation to them. Attention is drawn to the fact that, with the disappearance of the old foci of the disease, a non-immune element is present in the population which increases the danger of reintroduction of the infection.

The term "suspected vessel", is one which in regard to yellow fever should be revised. "I think the definition as made by the last International Sanitary Conference in Paris (1911), unacceptable then, ought to satisfy the majority of my hearers now, more so, in face of the present status of yellow fever in America. 'A vessel is considered suspected (or suspicious), when it has had cases of . . yellow fever on board at the time of departure, or during the voyage, but no new cases for seven days.'"

E. J. W.

Corlette (C. E.). **Insecticidal Fumigation in Ships, with Special Reference to the Use of Hydrocyanic Acid and to the Prevention of Ship-Borne Yellow Fever.**—*Med. Jl. Australia.* 1916. Nov. 4 & 11. Vol. 2. 3rd Year. Nos. 19 & 20. pp. 384–387, 404–409.

Following on a critical consideration of the various methods of insect fumigation of ships the author advocates the use of hydrocyanic acid gas delivered by means of the Harker apparatus.

This appliance, which is primarily for the prevention or extinction of fires in closed spaces such as a ship's hold, can be readily used for the introduction of poisonous vapours. The supply of vapour can be delivered at any desired temperature for an unlimited time and at high speed. It can be maintained after delivery at a slight positive pressure and may be quickly expelled with fresh air. The apparatus has been in use for ship fumigation in several American ports and has been adopted by the Australian Quarantine Department. In the author's opinion hydrocyanic acid gas can be used without undue risk to life, while it is inexpensive and convenient to produce and is the most effective known chemical insect eradicator.

It is suggested that as a safeguard in the case of living quarters, some irritating substance, such as volatile oil of mustard, can be easily introduced into the current before the poison is liberated.

For details as to the employment of " American Cyanide " (sodium cyanide) in place of " German Cyanide " (potassium cyanide) the original paper must be consulted.

A warning is given against the use of low grade cyanides containing a considerable percentage of common salt, the ultimate chemical effect of which is to put the HCN out of action.

E. J W.

MISCELLANEOUS.

HEDBLOM (Carl A.). **On Disease Incidence in China.**—*Boston Med. & Surg. Jl.* 1917. Apr. 12. Vol. 176. No. 15. pp. 530–535. *China Med. Jl.* 1917. July. Vol. 31. No. 4. pp. 271-283.

In a recent number of this *Bulletin* [Vol. 9, p. 254] a paper by Dr. MAXWELL on this subject was summarised. The information in the present note is of a more precise character—the author is attached to the Hospital of the Harvard Medical School of China, Shanghai—but is drawn from a smaller area, its source being fourteen annual mission reports dealing with 15,800 in-patients in hospitals " with few exceptions located in the coast provinces." It is pointed out that " practically the only source of first hand information in regard to disease incidence " in China " is from the small handful of Western trained medical men working in a few widely scattered, inadequately equipped and under-staffed mission institutions."

A table of disease conditions grouped under 41 " large general headings " is given showing the cases and percentages under each heading in the Chinese hospitals and, for the same numbers, in the General Hospital, Massachusetts, in 1913–14. Commenting on this, the author writes :—

> " It will be noted that specific infections and general diseases, parasitic infections, general injuries and infections of skin and subcutaneous tissues, diseases of bones and joints, diseases of the eye and of the rectum and anus, constitute more than two-thirds of the Chinese cases, but considerably less than one-third of the Massachusetts General Hospital cases. . . . The most notable differences are those relating to rectal diseases and parasitic infections, of the combined total of which the Massachusetts General Hospital has only 2·45 per cent., as against 16·6 per cent. . . . About 60 per cent. of the European cases of disease of the liver and gall-bladder are cholelithiasis and 6 per cent. cirrhosis. Among the Chinese about 43 per cent. are of cirrhosis and none of gallstone."

A table of the specific infections and general diseases (2781 cases) shows for :—

Tuberculosis	22 per cent.	Beriberi	6 per cent.
Syphilis	21 „ „	" Chronic infectious arthritis "	6 „ „
Gonococcus infection	14	Relapsing fever	1 „ ,
Enteric	15	Pneumonia	1 „ ,
Trachoma	10 „ „		

Of the tubercular cases 141 were pulmonary, 164 of joints, 129 of lymph nodes. " Enteric infection " includes dysentery, in most cases of which (176 out of 205) the cause was unknown; half the cases were of the typhoid group. The epidemic diseases small-pox, cholera, plague—naturally bulk small, seeing the source of the information. Another table shows the incidence of the communicable infectious diseases in the Isolation Hospital, Shanghai for 1915; there were 89 cases of scarlet fever in Chinese, diphtheria 36, measles 21; separate figures are given for foreigners. Leprosy, though infrequent in these figures, is very common in China.

Other diseases mentioned in the reports are typhus (5 cases), tetanus (9), anthrax (3), anterior poliomyelitis (1). Kala azar and rabies also occur in China.

The list of parasitic infections does not differ from that of Maxwell, save that filariasis is not mentioned. Of diseases of the eye cataract (15 per cent.), entropion (15 per cent.), conjunctivitis 14 per cent.), head the list, but trachoma were it included here would stand first. Of diseases of metabolism diabetes was seen three times, scurvy once, chronic alcoholism twice. Of malignant disease it is written, "The tables would seem to indicate that practically nothing is known as to the actual incidence of malignant disease among the Chinese, and this represents the extent of our exact knowledge of disease incidence in general in China." The diseases of the nervous system include two of tabes and two of paresis; in a clinic for mental disorders of 327 cases 15 per cent. were of general paresis. For figures of other conditions the paper must be consulted.

[Diseases mentioned in Maxwell's communication which do not find a place here are—dengue, undulant fever, tropical abscess of liver and tropical febrile splenomegaly. Perhaps these are diseases of South China.]

A. G. B.

Kermorgant. **Maladies qui ont régné en Indochine en 1915.**—*Bull. Acad. Med.* 1917. June 5. 3 Ser. Vol. 77. Year 81. No. 23. pp. 738–748.

Under the name Indo-China are grouped Cochin China, Cambodia, Laos, Annam, Tonkin, and the Kwang-Chow-Wan territory, the whole occupying 14 degrees of latitude [8°–22° N.]. The diseases are classed as (*a*) endemo-epidemic and (*b*) sporadic.

(*a*) Of *small-pox* there were registered in 1915 989 cases with 157 deaths. Many cases of course do not appear in such statistics. The vaccinations numbered 1,718,289. This year was a bad one for *cholera*, which was especially severe in Cochin China. Direct contagion was the chief cause of spread. The cases declared numbered 9.894, and the deaths 6,326. *Plague* was reported in the south, and especially at Kwang-Chow-Wan among the Chinese; there were 976 cases, half as many as in 1914; it was almost exclusively bubonic. Anti-plague prophylaxis has been practised with energy, deratisation in Cambodia and Annam only. Disinfection is of little value owing to the construction of the houses; deratisation cannot be carried out except where it can be organised by the Administration. *Beriberi* has much diminished in Cochin China in barracks, schools, and prisons owing to the "surveillance of diets and the distribution of freshly decorticated rice." The cases treated numbered 144, chiefly Annamites, Chinese from junks, and coolies on rubber plantations. It occurs also in the other countries. *Dysentery* was as prevalent as in the preceding year, but the complications were less numerous owing, it is stated, to the use of emetine. It is reported that the disinfection of wells by permanganate of potassium proved useful. *Anthrax* occurred in a village in Laos where the natives had eaten the meat of diseased cattle and buffalos and had kept the skins. *Relapsing fever* was reported in 1914, but not in 1915.

Malaria comes at the head of the disease tables but is on the decrease where quinine is distributed. In Cochin China, where the rice cultivation produces many stagnant pools, anti-mosquito work is difficult;

no part of Cochin China is free from malaria. Figures are given for all the countries but are not worth quoting for no mention is made of species of parasites, nor even whether such were found. *Blackwater fever* occurred in Annam (5 cases) and Tonkin (26 cases), but not in Cochin China and Cambodia. It is found chiefly in the highlands. *Tetanus* causes a large infantile mortality but has become rare in Cochin China since the institution of native midwives.

Leprosy. The only statistical figures come from the leproseries where not more than a fraction of the patients are treated; they are only of value as showing the expenditure incurred. In Cochin China a number of patients are allowed to live near their families on condition that they are isolated and maintained. The isolation is illusory because the natives consider that the disease is not contagious but a divine punishment, and take the leprous as servants for a low wage. The numbers given are:—Cochin China, 2,163; Cambodia, 800; Laos, 300; Annam, 1,883; Tonkin, 2,437. For want of accurate figures it is impossible to say whether leprosy is on the increase or decrease. *Rabies* is reported from four of the countries forming the Indo-Chinese Union; there are three Anti-Rabic Institutes. In Cambodia, where 12 cases occurred, stray dogs are spared; the well-to-do classes holding the doctrine of metempsychosis, and seeking to liberate dogs seized by the Administration. One hundred and sixty-five cases were treated in Cochin China and an equal number in Tonkin. *Intestinal parasitism* is rampant; few details are given. Anaemia due to helminths is at least as common as that due to malaria.

Among (*b*) sporadic maladies, one notes *tuberculosis,* which rages among all classes. It is becoming more and more common and prisoners pay a heavy tribute. Its progress is usually slow. The osteo-articular forms are frequent—coxalgia, white swelling, Pott's disease—as well as tubercular glands in the neck [cf. China above]. It is stated, without figures, that *stone* in the bladder is frequent in young children. *Malignant disease* is found the more the natives come for treatment, and many cases come to light at autopsy. Of *typhoid fever* there were 74 cases and 13 deaths. *Syphilis* is widely spread. Primary sores are rarely seen; they are of no account among the natives.

A. G. B.

BOYD (Augusto S.) & YOUNT (C. C.). **Routine Spinal Analgesia with Report of 6,229 Cases.**—*Proc. Med. Assoc. Isthmian Canal Zone.* 1916. Jan.-June. Vol. 9. Pt. 1. pp. 115–127. With 1 chart.

Since 1909 spinal analgesia has been used in the Santo Tomas Hospital, Panama Canal Zone, "routinely, except when contra-indicated, for all surgical operations below the umbilicus, frequently for operations on the upper abdomen and rarely for higher regions of the body." Twenty-seven doctors have contributed to the series of 6,229 cases. The majority of the patients are West Indian negroes and native Panamanians, who are more favourable subjects for the method than whites. The preparation used has been one containing 0·1 gm. each of stovain and sodium chloride and 1·0 cc. of distilled water. 'For operations requiring one half hour or less 5 cgm. are given, for longer operations the dose is increased proportionately."

Enough morphine is given one half hour before operation to tranquillize the patient. Owing to the constant drop in blood pressure in using stovain—in one case the pressure fell from 185 to 85—patients in a state of shock, from haemorrhage or other cause, and patients with low blood pressure have been excluded. Details are given of the technique and an account of the failures, which amounted to 0·8 per cent. in the case of one of the authors, and 6·25 with six less experienced doctors.

Gratifying features are the complete muscular relaxation and the contracted condition of the intestines; there is much less post-operative distention after spinal analgesia than after ether narcosis. Vomiting or other associated symptoms may appear 12 to 25 minutes after the injection, when the blood pressure has reached its lowest point. In only one case was the injection the sole cause of death, though it appears to have contributed to four. Among the authors' conclusions are the following:—

> "Spinal analgesia has a fairly wide field in which it is the anesthetic of choice in every respect, including the lowest mortality; namely, for hernia, except those varieties occurring above the umbilicus; all genito-urinary operations except those involving the kidney and upper ureters, operations on rectum, anus, perineum, vagina, cervix, and lower extremities. All pelvic operations can be done successfully and satisfactorily with spinal anesthesia. In order to eliminate all elements of danger Babcock's technique with lighter solution than cerebro-spinal fluid should be used.
>
> "In cases where ether is contraindicated, bad lungs, kidneys, arteries, etc., spinal analgesia would be the choice. Operations above the umbilicus can be done more satisfactorily with general anesthesia; the same may be said of very weak patients with low blood pressure and nervous, hysterical, and highly excitable individuals. Also, as a general rule, children should have a general anesthesia."

A list of operations performed concludes the paper.

A. G. B.

NEWTON-DAVIS. **The Quarantine Station of Tor.**—*Indian Med. Gaz.* 1917. June. Vol. 52. No. 6. pp. 197–200. With 3 figs.

An account of the Quarantine Station at Tor, the largest in the world, at which the author spent three months in 1916.

It is used exclusively by pilgrims returning from Mecca, and it is open for two and a half months in each year. The cost of construction was £250,000. The station is served by some 30 doctors. Many interesting details are given. By far the most common disease is dysentery and it is stated that the type is "of the mixed variety almost without exception."

A. G. B.

DELANOË (P.). **Au sujet de l'existence dans de Cercle des Doukkala (Maroc Occidental) de la sangsue de cheval, *Limnatis nilotica* Savigny.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 458–459.

The wells in the Doukkala District are often infested with horse leeches, and the Arabs are attacked when they drink the water. A case in a child is related where the symptoms were intense dyspnoea, "roaring," a temperature of 38·5°, and scattered râles; the dyspnoea came to an end suddenly and a leech was found in the mouth. The leeches are also found in streams. In 1914 five out of 40 pigs were asphyxiated, and horses are often attacked. The natives pound onions and tobacco together and pour the liquid obtained drop by drop into the nostrils and throat. The animal sneezes and coughs violently, and at last throws up the leech.

The wells may be cleared by stocking them with eels.

A. G. B.

GOODRICH (Helen Pixell). **Mouth-Washes in Health and Disease.**—*Brit. Med. Jl.* 1917. Apr. 14. pp. 473–475. With 2 figs.

The author says that the aim of oral hygiene is the prevention of the growth of leptothrix which produces tartar and, she believes, is the cause of pyorrhoea. This is accomplished by the use of a soft brush and a suitable mouth wash. The experiments here described show that a saturated aqueous solution of thymol is a very good antiseptic for ordinary mouth bacteria. Such a solution is prepared by putting a lump of thymol into a bottle of cold or warm (not hot) tap water. The bottle is allowed to stand and is shaken; as the solution is used it should be filled up with water. At present price the cost is less than 5*d.* per gallon. Proprietary mouth washes which were tested were all inferior to thymol, and it is pointed out by the author elsewhere (*British Medical Journal*, 1917, May 19th, p. 647) that this may be due to the presence of glycerine, which diminishes the antiseptic power of many substances that are active in solution in water.

[A correspondent in a later number of the same Journal says that thymol in this strength is too pungent and will, if used habitually, of itself cause gingivitis.]

A. G. B.

JAMAICA. **Six-Monthly Report on the Work carried out in the Government Bacteriological Laboratory October 1916–March 1917.**—[By Dr. H. Harold SCOTT, Government Pathologist.] MS. Report to Colonial Office.

Dr. Scott was away except for part of the last month. Drs. CATTO and C. A. H. THOMSON in succession were in charge of the laboratory. Only routine work was performed. Under heading Widal examinations it is recorded that of 678 sera tested 252 or 37·1 per cent. yielded positive results. The table shows the enteric fever findings in this and the last report.

	October Report.	March Report.
B. typhosus	210	229
B. para. A	7	6
B. para. B	1	—
B. typh. and *Para.* A ..	14	16
B. typh. and *Para.* B ..	1	1

The records of malaria and helminths do not call for notice. The author at the end of the period investigated a local epidemic of vomiting sickness and shows how difficult it is to obtain a record of the eating of ackees; he gives also a preliminary account of an outbreak of (?) myelitis at Spanish Town. The Report closes with the usual tables.

A. G. B.

WALLIS (R. L. Mackenzie). **Improvements in Bacteriological Media. I.—A New and Efficient Substitute for Nutrose.**—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 786–796.

Nutrose is a patent German preparation and a constituent of Conradi-Drigalski and Nasgar media. It is stated to be " casein combined with an alkali (sodium)." The author found that it contains 15·9 per cent. protein, 10 per cent. fat and 66 per cent. carbohydrate, instead of about 90 per cent. protein as it would if the description were correct. From the presence of a vegetable globulin and fat it was concluded that nutrose contains pea-nut flour in quantity, and it was found that though both casein and pea-nut flour were insoluble in water the presence of a small quantity of sodium carbonate sent both into solution. The author goes on to a description of the pea-nut, which is cultivated in India, Africa and South America, and its composition ; the flour contains 44·5 per cent. protein and only 23·8 carbohydrate , there is evidence for the presence of an active chemical principle of the nature of a vitamine.

The substitute for nutrose made up by the author consists of :—

Peanut flour	94 parts.
Casein	5 ,,
Sodium carbonate	1 ,,

This when stirred into hot water goes into solution. It was used in the preparation of Conradi-Drigalski medium and yielded a transparent medium which gave better results in the cultivation of typhoid than that made up with nutrose. It is suggested that the substitute will prove a valuable food-stuff, for diabetics and for admixture with ordinary flour. A. G. B.

BLANCHARD (R.). **Le danger du paludisme et de la fièvre jaune en France ; moyens de l'éviter.**—*Bull. Acad. Med.* 1917. May 22. 3 Ser. Vol. 77. Year 81. No. 21. pp. 657–669.

The author was instructed by the French Government to study the parasitic diseases of the black troops on French soil ; and to ascertain if Anopheles were present on the Mediterranean littoral where numerous soldiers infected with malaria had been evacuated. He found *A. maculipennis*, the usual vector of malaria in France, along the littoral of the Alpes-Maritimes Department, and, moreover, *Stegomyia calopus* in abundance all along the French Mediterranean coast. He points out the significance of these findings. He gives the distribution in Europe of the five chief Anophelines, all of which convey malaria, and shows that two of these occur in France, and four in Greece, where the French army has suffered greatly. He goes on :— " The English Eastern Expeditionary Force has suffered from malaria much less than the French. The English have rightly looked upon the Macedonian campaign as a colonial war, a ' medical war ' as their graphic and accurate term is ; doctors have played a preponderant part and this explains the relatively favourable sanitary condition of their Expeditionary Army." No systematic study has been made of the Anopheline fauna of France ; the need for a careful inquiry into the subject is urged, in view of the numbers of malarial subjects now in France and the frequency of reported cases of infection. Hospitals for malarial cases must be placed in Anopheles-free districts.

A. G. B.

DEAN (H. R.), ADAMSON (R. S.), GILES (J. D.) & WILLIAMSON (R.). **A Bacteriological Examination of Convalescents from the Mediterranean Expeditionary Force.**—*Jl. Roy. Army Med. Corps.* 1917. Apr. Vol. 28. No. 4. pp. 428–460.

The examinations consisted in six bacteriological of faeces and urine for enteric, and three bacteriological and three protozoological for dysentery patients. For details of the methods the paper must be consulted. The macroscopic method of agglutination was used.

Summary.—Four hundred and eighty-eight cases from the Mediterranean Force were examined. Of these 308 had been diagnosed as enteric fever, 160 as dysentery, and 20 as dysentery and enteric. In no case was *B. typhosus* isolated from either faeces or urine.

"*B. paratyphosus* A was isolated from three cases, in two cases from faeces, in one case from urine. Two cases had been diagnosed as enteric fever and one as dysentery. Serum from these patients agglutinated an emulsion of paratyphosus A.

"*B. paratyphosus* B was isolated from three cases, all of which had been diagnosed as enteric fever, and in all three cases the bacillus was found in the faeces. Serum from these patients agglutinated an emulsion of *B. paratyphosus* B.

"*B. dysenteriae* (Flexner and Y types).—Strains fermenting maltose were isolated from two patients The serum from one of these agglutinated an emulsion of the stock Y bacillus.

"Strains which did not ferment maltose were isolated from two cases. The serum from one of these patients agglutinated the stock Y bacillus.

"From one patient were isolated two strains, one of which fermented maltose, while the other did not. The serum of the patient agglutinated the Y strain, but not the Flexner strain.

"*B. dysenteriae* (Shiga type) was isolated from six of the 488 cases. Of these two had been diagnosed as dysentery, three as enteric fever, and one as dysentery and enteric. The serum from three of these patients agglutinated an emulsion of the stock Shiga bacillus.

"*E. histolytica* was found in fifteen of 439 cases. Of these seven had been diagnosed as enteric fever and eight as either dysentery or dysentery and enteric.

"Of 488 convalescents 3 were found to harbour *B. paratyphosus* A; 3 *B. paratyphosus* B, 5 *B. dysenteriae* (Flexner), 6 *B. dysenteriae* (Shiga), and 15 *E. histolytica*. Only 259 of the 308 enteric cases were examined for amoebae. The total number of carriers among the 488 was 32, that is to say, rather more than 6·5 per cent.

"*Other Bacilli.*—Six strains were isolated which were probably members of the paratyphoid family. Investigations of these strains are being continued. In many other cases the MacConkey plates were covered with pale colonies, which proved to be varieties of bacilli not as yet associated with pathological changes. A short account of the strains which were isolated and examined has been given above.

"The results attained by an examination of the sera of unselected cases may be summarised as follows. No slight or doubtful reactions have been included :—

Paratyphoid A.

	Number of cases.	Positive reactions.	Percentage.
Enteric	171	17	10
Dysentery	130	1	0·7
Enteric and dysentery ..	16	0	—
All cases	317	18	5·6

Paratyphoid B.

	Number of cases.	Positive reactions.	Percentage.
Enteric	171	60	35
Dysentery	131	19	14·5
Enteric and dysentery ..	16	5	—
All cases	318	84	26·4

Y bacillus.

	Number of cases.	Positive reactions.	Percentage.
Enteric	170	8	4·7
Dysentery	7	2	—
Enteric and dysentery ..	13	1	—
All cases	190	11	5·7

Shiga bacillus.

	Number of cases.	Positive reactions.	Percentage.
Enteric	171	4	2·3
Dysentery	132	8	6
Enteric and dysentery ..	16	1	—
All cases	319	13	4

"The number of sera which strongly agglutinated the two varieties of paratyphoid bacilli A and B was large, and if only those cases are included in which a very strong reaction was obtained, we arrive at the conclusion that thirty-three per cent. of all patients had suffered from paratyphoid infections. The percentage for patients clinically diagnosed as enteric is forty-five.

"The figures obtained with the two types of dysentery bacilli are much lower. Here the results obtained by the agglutination method probably do not provide a reliable index of the prevalence of bacterial dysentery. The serum of only half of the dysentery carriers agglutinated the homologous strain of dysentery bacillus. Moreover, the titres of the sera which did agglutinate either bacillus Y or the Shiga bacillus were much lower than the titres of most of the sera which agglutinated the two varieties of paratyphoid.

"The cases of amoebic dysentery treated by emetine were hardly numerous enough to afford valuable information. The results obtained appeared to show that emetine injections produced the disappearance or reduction in numbers of the parasite. In a few cases, however, the parasites, after an interval, reappeared.

"The fact that *B. typhosus* was in no case isolated from either faeces or urine is evidence of the value of preventive inoculation."

A. G. B.

WANLESS (W. J.). **Abdominal Surgery: Notes and Observations on the Operative Work of the Miraj Hospital for the Year, 1915, including some more Recent Cases.**—*Indian Med. Gaz.* 1917. Apr. Vol. 52. No. 4. pp. 121–127.

There were performed 212 abdominal operations during the year. It is noted that there were some 15 cases of wound infection " of a low grade non-virulent type." It was due in some instances to the use of " bazar gauze which had not been boiled," but sterilised in the autoclave. Sterilisation by boiling eliminated the trouble. It was noted also that in Indian patients of the lower and middle classes iodine as a skin disinfectant, applied immediately before operation on the table on a dry skin, is not a sufficient precaution against wound infection.

In this year 48 gastro-enterostomies for gastric and duodenal ulcer were done. " The majority of patients with gastric and duodenal ulcers come from districts where jwari and bazri bread with raw chillies and hot curries are extensively used as the principal articles of diet. Comparatively few of our patients have come from districts where rice is the principal ration." Of 812 abdominal operations performed in three years 49, or 6 per cent. were for abdominal tuberculosis; 35 of these were bowel infiltrations. These figures " serve to confirm our own impressions regarding the increase of tuberculosis in India in general." " The von Pirquet test is of considerable value in making a diagnosis in suspected cases, especially when positive. We have not infrequently found quite extensive abdominal tuberculosis when the von Pirquet test gave a negative reaction." Intestinal obstruction due to worms was met with on several occasions.

A. G. B.

BASSETT-SMITH (P. W.). **Mixed Blood Infections in Cases from West Africa.**—*Jl. Roy. Nav. Med. Serv.* 1917. Apr. Vol. 3. No. 2. pp. 202–204. With 2 figs.

In the course of examination of cases of fever received from West Africa Fleet Surgeon Bassett-Smith has been impressed by the frequency of occurrence of mixed infections of protozoal and other organisms in the blood, tending to make the blood picture " very strikingly abnormal."

Amongst the associations he has found are: quartan and malignant malaria + trypanosomes; quartan and malignant malaria + *Filaria perstans* + Calabar swellings (and probably *F. diurna*). In such cases a high degree of eosinophilia was noticed. Thus in one case in seven blood counts the eosinophiles varied between 35 and 50; Calabar swellings were present but no sheathed embryos were found in many blood examinations, nor did puncture and examination of the swellings themselves discover any parasites. *F. perstans* was only demonstrated by a special method. Entozoal parasites as the cause of the eosinophilia were excluded. Was it due, the author asks, to the *loa* infection or to *F. perstans*?

A. G. B.

COLYER (S.). **The Differential Leucocytic Count in the Blood of Natives.** --*S. African Med. Rec.* 1917. June 23. Vol. 15. No. 12. pp. 183–185.

The author, who is in the North Rhodesian Medical Service, recognizing the need of a standard for differential leucocyte counts of native blood decided to ascertain it for himself. He therefore made counts from 99 apparently healthy male natives, 33 from each of the 2nd, 3rd and 4th to 5th decades. If any malarial parasites were noticed the slides were discarded. This happened in ten instances and as the differential counts from these slides corresponded with those from the 'healthy' natives it appears that, unless chronic malarial infection does not produce deviation from the normal in Northern Rhodesia, the counts were made in many instances on chronic malarial blood. He distinguishes between an average count and a normal count, the normal being "the middle third of each count when arranged in an ascending series " He often found it impossible to distinguish clearly between large mononuclears, large lymphocytes, and certain myelocytes. Transitional cells were not estimated. Two hundred successive leucocytes were counted on each slide; the difference in the respective decades was quite small. The individual counts are not given.

The results of the mean average and normal counts are thus stated:—

	Polynuclear.	Lymphocyte.	Monocyte.	Eosinophil.	Basophil.
Average	31·3	55·3	5·6	7·1	·6
Normal	25–35	50–60	4–6	5–7·5	0–2

The mononuclear count exceeded the polynuclear in 90 per cent These counts are compared with a few blood counts made by others in the case of sleeping sickness and by the author in tick fever. In this disease he is satisfied that a diagnosis may be made from the relative increase of polymorphonuclears and the practical absence of eosinophils.

[Differential counts from healthy natives of British New Guinea (BREINL & PRIESTLEY) gave 51 per cent. polymorphs, from Filipinos 51 per cent. (GUERRERO & SEVILLA) and from West Africans 44·8 per cent. (CONNAL); the last two figures are given on the authority of Dr. MACFIE. Dr. Colyer's figures for this type of leucocyte are remarkably low.]

A. G. B.

i. SERGENT (Edmond) & SERGENT (Etienne). **Expérience de lutte antiophtalmique en milieu indigène algérien (1914).**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 486–489.

i. Epidemics of contagious eye diseases are frequent among the poorer classes in Algeria, and spread very quickly; they are most common in September and October and are chiefly due to the Weeks bacillus and the Morax diplo-bacillus. Daily care in treatment is essential, and to prevent spread it is necessary to find and treat from the outset the first cases that appear in a village. In an endeavour to check the usual autumn epidemic use was made of two Agents of the antimalarial service, whose duty it is to distribute quinine, who had the entire confidence of the natives. The requisite was a remedy which could be applied easily and in all varieties of conjunctivitis, and this was found in a one per cent. solution of silver nitrate. The Agent was told, in any case of eye disease with discharge but no corneal ulceration, to instil a drop of the solution daily for two or three days: a drop-bottle was supplied. Sixty-six persons in all were so treated, the average duration being in one instance 2, in the other 3–4 days. Cure was rapid and the disease did not spread. The effectiveness of the treatment, both for cure and prevention, was recognised by the natives. The anti-ophthalmia campaign will be resumed in 1917.

ii. Gros (H.). **Contribution à l'étude des conjonctivites en Algérie.**—*Ibid.* July. No. 7. pp. 521–526. With 5 charts.

ii. In 1905–1907 the author registered all the cases of eye disease seen at the native hospital of Rébéval; they numbered 4,180. Of these patients 22·5 per cent. had non-granular conjunctivitis, and 34·5 per cent. granular conjunctivitis. By far the most frequent complication of the latter was entropion of the upper lid, seen in nearly half the cases, pannus coming next. Curves show the monthly and age incidence of the two forms of conjunctivitis The non-granular form begins to increase in March, reaches its maximum in September and then declines rapidly; the granular rises similarly but more slowly, reaching its maximum in July. It is noted that September is the hottest as well as the driest month and that the rains come in October. The non-granular form affects chiefly adults from 30 to 50; the granular has two maxima, one at 10–15, and a greater at 20–30. Another point of interest is that non-granular conjunctivitis was met with three times as often in males as in females whereas the sex distribution in trachoma was approximately equal. This disease is one of youth and is probably spread by the domestic fly. In 850 consecutive examinations of conjunctival secretion there were no bacilli found in 267, bacilli of Morax in 366, small cocci in 143, and bacillus of Weeks in 52. The 267 cases were granular.

A. G. B.

Morax (V.). **Le trachome des travailleurs coloniaux.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 269–272.

One result of the war has been that France has had to bring into her factories a number of Africans and Asiatics belonging to countries in which trachoma is wide spread. The author asks whether trachoma may not be thereby spread in France. He distinguishes between past and recent trachoma (*éteint et floride*). To restrict introduction to, say, Arabs with normal cornea and conjunctiva would mean to reject nine out of ten; inclusion of those with past trachoma would mean rejection of not more than two to four out of ten.

The following table shows the trachoma-infected natives, past and present disease, introduced into France in January, 1917.

		Effectifs.	Cas de trachome.
Africains	Maltais	13	4
	Malgaches	362	18
	Marocains	517	182
	Arabes et Kabyles	588	190
	Algériens	670	307
	Tunisiens	1,035	449
Asiatiques	Indo-Chinois	876	227
	Chinois	1,177	89
	Annamites	2,540	378
	Total	7,778	1,844

In some instances there had been selection before embarcation. The figures however show that about a quarter had or had had trachoma—40 per cent. in the African contingent, 15 in the Asiatic. In 17 per cent. the disease was active. Trachoma is transmissible, by what agency is not certainly known, and the risk is greater in that the early stages of the disease often pass unrecognised, and the patient is afterwards cured with difficulty. It is much easier to prevent than to cure trachoma. Ways are indicated in which the risk of spread may be minimised.

In a discussion which followed the reading of Morax's paper VAILLARD recalled that Napoleon's army contracted the infection in Egypt and brought it back to Europe where, especially in Belgium, trachomatous foci had existed ever since.

A. G. B.

LITTLE (John M.). **An Eskimo "Deficiency Disease."**—*Boston Med. Surg. &Jl.* 1917. May 3. Vol. 176. No. 18. pp. 642–643.

A disease named "kallak" is prevalent among the Eskimos of Labrador and Baffin Land. There is an eruption of pustule-like lesions on the hands, elbows, and buttocks, and intense itching. The course is protracted, the ultimate issue being recovery. For long periods the natives' diet is very limited. The disease is most frequent in the autumn after a period of fish diet; when there is plenty of seal meat it does not occur. It is suggested that the condition is due to the absence of a fat-soluble substance.

A. G. B.

i. SPEARMAN (B.). **Anthrax in Uganda.**—*Brit. Med. Jl.* 1917. June 16. p. 809.

ii. EURICH (F. W.). **Anthrax in Uganda.** [Correspondence.]—*Ibid.* June 30. p. 894.

i. The patient was a Swahili with acute pulmonary symptoms. "Clinically the case presented a typical picture of acute pulmonary tuberculosis." Microscopical examination of the sputum showed absence of tubercle and plague bacilli, but presence of anthrax bacilli with "marked granular staining." Death occurred after ten days' illness. Post-mortem films taken from the "caseating masses" in the lungs showed anthrax bacilli, one from the spleen none. Dr. Spearman believes this to be the first case reported from the Protectorate.

ii. Dr. Eurich of Bradford thinks that in the absence of cultural confirmation the utmost scepticism is justified. He points out that internal anthrax usually runs its course in 3–5 days, that the finding of anthrax bacilli in the sputum is far from common, and that in some thirty cases of pulmonary anthrax he has seen neither "grey hepatisation" nor "small caseating masses" were ever observed. He notes too that no mention is made of the "peculiar terminal stage of collapse," nor of the usual gelatinous deposit in the anterior mediastinum.

A. G. B.

Pijper (A.). **Some Unusual Infections. II.--Moniliasis.**—*Med. Jl. S. Africa.* 1917. Mar. Vol. 12. No. 8. pp. 129–130.

The case was that of a man of 40 with a chronic cough and emaciation; he had spent his life in South Africa but had not worked in a mine. His illness was of seven years' duration. Signs of bronchitis were audible over both lungs; the sputum was whitish yellow. No tubercle bacilli could be found, but yeast-like cells and sometimes long threads. These cells grew on solid media, in liquid media the threads gained the upper hand. The cells were from 1 to 6μ in diameter, with a well-defined wall; the threads were septate, from 0·75μ to 1·5μ thick, and as much as 80μ long. The appearance of the fungus on solid media and the sugar reactions are described. It proved very pathogenic to rabbits. The patient was treated with a "bacterial vaccine" prepared from a culture of the Monilia and a year later had improved.

[Castellani and Chalmers in the last edition of their "Manual" give an account of broncho-moniliasis on pp. 1285–8.]

A. G. B.

Hatori (J.) & Shoji (T.). **[An Epidemic of Polyneuritis in the Island of Botel Tobago, Formosa, following a Disease like Influenza.]**—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1916. Nov. 28. No. 169. pp. 887–916. [From Review by R. G. Mills.]

The author records his clinical observations in this island, which is well within the torrid zone and has an annual temperature variation from 16° to 36° C. The inhabitants number about 1,500 and belong to the Yami branch of the Malay race. They are naked savages and live largely on *Colocassia antiquorum*, *Solanum nigrum*, *Exocoetus evolans* (flying fish), *Pometia pinnata*, with smaller amounts of meat in the form of pigs, goats and chickens. Their isolation has been so absolute that they have been spared the ordinary infectious diseases except malaria.

In 1916 there occurred an epidemic which was described as like influenza and in some cases like pneumonia, which caused a rather high mortality. In 48 cases observed by the author the chief symptoms noted were, paralysis of the legs, loss of patellar reflex, paralysis of the facial nerve, tongue, throat or chest muscles, joint or muscular pains, swelling of joints, loss of sensation, constipation, anorexia, splenic tumor, tachycardia and various other alterations in the cardiac and respiratory functions. Various combinations of this list of symptoms followed an acute attack which was clinically influenza. The resemblance of certain cases to beriberi was noted but the absence of polished rice was a point worth recording.

A. G. B.

HATORI (C.). **[3rd Report concerning Glandular Fever in Formosa.]**—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*). 1916. Dec. 28. No. 170. pp. 963–990. [From Review by R. G. MILLS.]

The glands involved were usually the inguinal, less frequently the cervical or cubital. The mortality varied from 9·3 to 10·2 per cent., and was greatest among the women.

The transmission of the disease is attributed by the author to the *Trombidium akamushi* because he produced a symptom complex in a Formosan monkey, by the bites of this mite, which was characterised by high fever, swelling of the lymph glands in the same locations and other signs that were also similar to the disease found in man.

[This is not the glandular fever of English text books, which occurs in children and "in which the prognosis is almost uniformly good" (OSLER's System)].

A. G. B.

BOTREAU-ROUSSEL. **Note sur le N'Goundou.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 480–483.

The author has seen on the Ivory Coast 117 cases of goundou, and has removed the paranasal tumours subperiosteally 108 times, 107 times with success. He groups them thus:—

(1) Paranasal tumours the only symptom, 48.

(2) Paranasal tumours the most striking symptom, but other hyperostoses present, 62.

(3) No paranasal tumour or, if present, secondary to other hyperostoses, 7.

In (1), (2) and (3) the bones most frequently affected were tibia (58), upper jaw (14), lower jaw (13), forearm, fibula (4 each), humerus, femur, clavicle (2 each), malar bone (1). The paranasal tumours were bilateral in 97 instances, unilateral in 13. There was never any history of intranasal infection or discharge, but always one of an eruptive disease called "Dobé," lasting from 3–12 months. Patients seen with "Dobé" obviously had yaws, and in the serum of the framboesial nodules *Spirochaeta pertenuis* Castellani was demonstrated, as was confirmed by M. BLANCHARD. At the autopsy of a goundou patient who died under chloroform and who had numerous bony lesions the tibiae were found much increased in volume; the compact tissue of the diaphysis had completely disappeared giving place to a spongy tissue; there was no trace of the medullary canal; other long bones showed similar lesions. The author concludes that goundou is a systematized hypertrophic osteitis, arising from yaws.

In the discussion MESNIL referred to the observations of MARCHOUX and himself (1911) on generalised osteitis in a Callitrichus monkey and a Cynocephalus; this he believes to be the same disease as goundou and he suggests that the aetiology of goundou may be resolved experimentally.

A. G. B.

ADERS (W. M.). **Insects injurious to Man and Stock in Zanzibar.**—*Bull. Entom. Res.* 1917. May. Vol. 7. Pt. 4. pp. 391–401.

A paper packed with information. *Anopheles costalis* Lw. is the common vector of malaria in Zanzibar; *A. funestus* is rarer and has not yet been found infected. *Stegomyia fasciata* is found everywhere breeding in the usual situations. It shows a preference for clear water, being rarely found with *Culex fatigans.* The latter is the commonest mosquito in the towns, and breeds chiefly in cesspools. "Larvae thrive and pupate in water to which 1 per cent. of common bar soap or 1 per cent. human urine has been added." A large number of other species of mosquitoes are recorded, with their breeding places. The author writes:—

> "During the last few years three kinds of traps have been used for collecting larvae of Anophelines, Culicines and Stegomyias, respectively. The Anopheline trap consists of a flat tub about six inches in height filled with rain-water and algae, with a small layer of earth sprinkled on the bottom. The Culicine trap consists of a half barrel filled with water rich in decaying vegetation; the addition of cess-pool water, rice or other organic material forms an attractive bait. The Stegomyia trap is made in the same way as the former, being filled with clean rain-water. I am of opinion that if these traps were used on an extensive scale, they would undoubtedly prove of great use as one method of mosquito eradication."

Sixteen species of Tabanidae are recorded, with their habits in many cases; a table shows the seasonal incidence of the commoner ones, and its relation to the rainfall. *Cordylobia anthropophaga* Grünb. causes cutaneous myiasis in man in Zanzibar; larvae have been obtained from man, dogs, rabbits, and guinea-pigs. *Musca domestica* breed chiefly in "manure pits containing fermenting horse and donkey dung." *Xenopsylla cheopis* is the commonest rat-flea; it has been taken from *Epimys norvegicus, Mus rattus,* and *Mus alexandrinus,* as well as from the giant rat (*Cricetomys gambianus*) and a shrew (*Pachyura murina*). *Pediculus humanus* is a common pest among Indians but is rarely found on native Africans.

A. G. B.

i. JACKSON (A. C.) & LEFROY (H. M.). **Some Fly Poisons for Outdoor and Hospital Use.**—*Bull. Entom. Res.* 1917. May. Vol. 7. Pt. 4. pp. 327–335.

ii. PHELPS (Earle B.) & STEVENSON (Albert F.). **Experimental Studies with Muscicides and Other Fly-Destroying Agencies.**—*U.S. Hygienic Laboratory.* Bulletin No. 108. 1916. Dec. 30 pp.

i. The authors refer to the success in Italy and South Africa of sodium arsenite solution and sugar as fly poison and to the good results thus obtained in Mesopotamia in 1916. They sought to find some compound less poisonous to man and less stable in a soluble form when thrown away. They therefore tested a number of substances in the Fly Room at the Imperial College of Science at a strength as a rule of

2 per cent. by weight with a 20 per cent. sugar solution. *Musca domestica* was used. The substances were classed according to whether they killed quickly, on the second day, or not at all at the strength tested. Ammonium and sodium fluorides were found to be good, being less poisonous to man than arsenite, cheap and readily procurable. Sodium and potassium salicylates were in the same class but acted more slowly. The iodates were also effective but are expensive. All these at 1 or 2 per cent. Iron perchloride (5 per cent.) was in the second class. A long list is given of compounds tested. The authors suggest the testing of these substances "in areas where flies are important" such as Egypt and Mesopotamia. "Many common drugs and substances, not known to be fly poisons, may be so under conditions where flies are really abundant."

ii. There is here recorded a series of carefully devised experiments which are well worth study by persons interested. Here again a substitute for arsenic was sought. Bred *M. domestica* were used, of known age and history for each experiment. They were exposed in cages for a definite period to the poison to be tested, to the standard poison (a one-thousandth normal sodium arsenite solution) and to water, respectively, and after 24 hours the dead flies were counted, the crude mortality being corrected by the normal death-rate (previously ascertained) for flies of this age; and in this connection it is noted that flies are little affected by poison till they are three days old, and have a large normal death-rate above ten days old. Most of the work was done at 32° C. The experiments are given in a series of tables and many interesting points are considered in the text. The authors summarise this part of the work as follows:—

> "Two solutions, formaldehyde in 0·5 to 1 per cent, and sodium salicylate in 1 per cent concentration, have been found to be at least as efficacious as the customary arsenic preparations. The efficiencies are from two to three times that of the standard arsenite solution at summer temperatures and do not suffer the marked lowering at lower temperatures so strikingly shown in the cases of the arsenite. Both are safe for domestic use. The formaldehyde is slightly more efficient as a muscicide. The salicylate is more readily prepared and more permanent, being nonvolatile, and does not involve the keeping on hand of a rather powerful and objectionable substance."

The "relative co-efficient" for the arsenite solution being taken as 1, for formaldehyde at ½ and 1 per cent. it was 2·32 and 2·34, for sodium fluoride 1 per cent. it was 3·19, for sodium salicylate 1 per cent. it was 1·39, and the same with 10 per cent. brown sugar 2·66.

> "For use in the household a formaldehyde solution of approximately the correct strength may be made by adding 3 teaspoonfuls of the concentrated formaldehyde solution, commercially known as formalin, a pint of water. Similarly, the proper concentration of sodium salicylate may be obtained by dissolving 3 teaspoonfuls of the pure chemical (a powder) to a pint of water."

These solutions were found to be more effective than sticky paper.

A. G. B.

Sen (S. K.). A Preliminary Note on the Rôle of Blood in Ovulation in Culicidae.—*Indian Jl. Med. Res.* 1917. Apr. Vol. 4. No. 4. pp. 729–753. With 2 text figs.

The author quotes the authorities to show the general belief that mosquitoes require a meal of blood if they are to propagate their species, but cites facts observed in nature which are against this view. His own experiments relate to *Stegomyia scutellaris*, a species which has a great thirst for blood and is therefore presumably in need of it. The insects had recently emerged in captivity. The technique is given and the protocols of many experiments. Eggs were obtained with a diet of milk and sugar (4 positive out of 14), peptone and sugar (4 positive out of 8), sugar only (2 positive in 20). Comparing the results with these foods and with blood respectively it is seen that fewer eggs were laid but that the egg, larval and pupal periods were about the same. Only in one case was a second batch of eggs obtained.

A. G. B.

TEICHMANN (E.). **Ein neues Mittel zur Bekämpfung der Stechmücken.** [A New Culicide.] *Münch. Med. Woch.* 1917. Aug. 7. Vol. 64. No. 32. pp. 1041–1042

The author has published successful experiments on the destruction of lice and nits by hydrocyanic acid. More recently he has tried the same method with adult mosquitoes in Germany, *Culex annulatus* and *C. pipiens*. Larvae and pupae were placed in a receptacle from which the imagines could escape into a gauze bag and many hundreds were treated at each trial. Most of the experiments were made in a space of two cubic metres. It was found that, whereas for the destruction of lice a concentration of two volumes per cent. for one hour was required, mosquitoes succumbed to 0·02–0·03 volumes per cent. in 15 minutes; that is, the mosquitoes were 400 times as susceptible as the lice. Mosquitoes removed at the end of the period and given air failed to come round. Experiments with Anopheles are suggested.

A. G. B.

HAYASHI (Y.). **[Mosquito Eradication by Fumigation.]**—*Taiwan Igakukai Zasshi* (*Jl. Formosa Med. Soc.*) 1917. Mar. 28. No. 173. pp. 153–162. [From Review by R. G. MILLS.]

For the wholesale destruction of mosquitoes which convey malaria, and possibly dengue, in Formosa the military authorities made use of a fumigator constructed as follows. About 25 gm. of the common insect powder of the markets was laid in a line in strips of waste paper and rolled into ropes about 2 feet in length. These cigarette-like rolls were twisted together with a strip of old cloth somewhat longer and projecting a few inches beyond each end. This rôpe was then doubled on itself in the middle and allowed to become twisted again, the projecting ends of the cloth, now brought together, were tied and used later as a means of attachment to stakes or trees wherever it was desired to apply the fumes. For indoor use in godowns or schools this combination rope was laid on a tile, suspended from some non-combustible support or put into a charcoal brazier. This preparation lighted at the doubled end will burn about two hours. The method is recommended for its convenience and for economy. The author reports a decrease of cases of malaria from 1157 in 1915 to 853 in 1916. [Rev. Note.—This common insect powder as sold in the market is said to be the pollen of the *Aster chinensis*, L.]

A. G. B.

Bacot (A. W.). The Louse Problem.—*Proc. Roy. Soc. Med.* 1917. Apr. Vol. 10. No. 6. (Sect. of Epidemiol. & State Med.) pp. 61–94.

In this paper, which is throughout "practical," the author deals with the immature period, pairing, egg-laying, fecundity, fertility, length of life, habits, proportion of sexes, gregariousness, phototropism, clustering of eggs, hatching, resistance to cold, relation of the head and clothes louse to each other, and hybridization. The following extract is of considerable interest to those who have studied the methods of prevention advocated in numerous papers.

"During the course of numerous experiments dealing with the destruction of *Pediculus humanus* under captive but otherwise natural conditions, I had several opportunities of observing the behaviour of escapes on my own clothing. It is most remarkable that these free insects tended to collect in close proximity to their captive fellows, in spite of the fact that the latter were imprisoned on pieces of flannel, treated with various insecticides, which from their smell should have exercised a deterrent effect. That the attraction was not always sexual was shown by the fact that immature lice collected in the same way."

The summary of features in the life-history of practical importance is as follows:—

"Eggs take seven or ten days to hatch under normal conditions, i.e., in clothing that is constantly worn; if discarded and allowed to cool for a period each day, the time of hatching may be extended for five weeks.

"Active lice can exist without food, and apart from any host, for periods of up to nine days.

"Young lice take from ten to fourteen days to attain sexual maturity.

"Females, after attaining maturity, require two to four days before they commence to oviposit.

"Egg production cannot take place without food, or under cool conditions (below 65° F.).

"Eggs laid by unpaired females do not hatch.

"Impregnation is not effective for more than twenty days.

"As many as ten or twelve eggs per day may be laid by each female

"A total of 300 eggs may be laid by one female.

"The female after maturity may live for forty-six days.

"Before the close of her life a single female may have 4,160 living offspring."

In the rest of the paper Mr. Bacot deals with preventive measures. After a discussion of the conditions in the fighting line and the failure of the authorities to cope satisfactorily with lousiness he remarks, "To reduce pediculosis to its lowest point it is necessary to use relatively stable, slow-acting remedies, in addition to one of quick action if of short duration." Discarded clothing should be treated by heat because this is more economical than hot fluids or steam; 55° C. for thirty minutes is a high enough temperature "if the garments are spread and hung." Ironing of seams is effective but less so and less economical than dry heat, if a hot room is available. Nits are destroyed "if they experience the heat of boiling water for half a minute." Of the inventors of insecticides it is written: "It is one of the peculiarities of the destruction of insects that economy of thought and extravagance in practice should be so general." Instances are given.

After prefacing the section on insecticides with the remark that they may act either by contact or vapour the author says, "For practical purposes it is necessary to use almost all remedies as if they had a contact value only, because under the conditions of use the diffusion of vapour at a concentration necessary to kill is limited to so small an area that the advantage of the vapour poison over a contact poison is of little if any moment. . . . The effective range of vapours between the skin and undergarments is so limited as to be almost negligible." It is possible that vapours may be deterrent, but he is not inclined to place much reliance in deterrents owing to the behaviour, mentioned above, of the escaped lice. He finds that "quite efficient insecticides when rubbed on the skin are of little, if any, use in preventing the insects feeding." He criticises from this and other standpoints some of the papers that have been published on the relative efficiency of various insecticides. The main points for consideration are, first, cost –"it is useless to trouble about remedies which, if used in sufficient quantities to be efficient, will cost more in a week or two than a new shirt"; secondly, speed of action in relation to duration; thirdly, how the preparation is to be applied. He goes on to recommend the impregnation of garments with crude carbolic acid emulsified with soft soap [see this *Bulletin*, Vol. 9, p. 103]. The strength to be used depends on the amount of sweating; whereas a 5 per cent. solution was efficient in summer, 10 per cent. was needed in winter; the moisture of the shirt sets free the emulsion. The most efficient quick-acting remedy of low cost he has used is naphthalene, either as powder, or dissolved by heat in oil or oily fluids which can be subsequently emulsified. "It might be supplied both as a powder for use by dusting a pinch or two in at the neck or put up as a paste by mixing with soft soap for the purpose of smearing along the seams of garments." Crude naphthalene is advised, 16 gm. per shirt if underclothing is to be impregnated. He next deals shortly with some 15 other remedies, some of them highly vaunted proprietary mixtures; some were inefficient, others too costly; and then sums up the preventive measures to be advised. Other points of interest will be found in the discussion by NUTTALL and LEFROY, and Bacot's reply thereto. LEFROY criticised Bacot's technique, holding that the only real test of efficiency of any substance is, "be verminous and clear yourself"; the author said that his technique "provides the minimum standard to be reached."

A. G. B.

GUNN (J. A.). **A Note on the Prevention of Pediculosis.**—*Brit. Med. Jl.* 1917. May 5. pp. 579–580.

The author recommends antiparasitic vests. These are of butter muslin dipped in a solution made of an ounce and a half each of naphthalene and sulphur in fine powder to one gallon of benzol or petrol, 24 hours being allowed for solution. They are cheap and appear to be effective in France, certainly against lice and possibly against scabies. They cause no irritation and retain the naphthalene and sulphur "sufficiently long for practical purposes." Some thousands have been distributed. "The testimony of officers and men has been unanimous in favour of the high or complete protection which these vests have afforded against *Pediculus corporis.*"

A. G. B.

Bacot (A.). A Simple Means of ascertaining if a Sterilizing Hut is Hot enough to destroy Lice and Nits in Clothing or Blankets.—*Brit. Med. Jl.* 1917. Aug. 4. p. 151.

A door thermometer is insufficient because the temperature varies in different parts of the chamber and because it only registers the highest temperature reached. The means recommended is the introduction of a known quantity of stearin of known melting point, and a definite surface area. With these variables rightly adjusted sterilization is complete when the stearin is seen to be melted.

A. G. B.

Poirson (Henri). Un cas de pseudo-parasitisme intestinal par larves de charançon [weevils].—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. p. 385.

A child of seven in Tunis, known to have a tape-worm, suffered every 15–20 days from headache with vomiting of food and bile, and slight rise of temperature. The author prescribed ethereal extract of male fern, after which the tape-worm was passed and with it six larvae recognized by Dr. Blanc of the Tunis Pasteur Institute as larvae of Curculionidae. The stools were watched daily for 20 days, but no more parasites were seen.

A. G. B.

BOOK REVIEWS.

i. RITCHIE (John Woodside) & PURCELL (Margaret Anna). **Sanitation and Hygiene for the Tropics. Book One, Primer of Sanitation for the Tropics. Book Two, Physiology and Hygiene for the Tropics.** With an Introduction by Dr. David P. BARROWS, formerly Director of Education for the Philippine Islands, and a Chapter on Opium by the Rt. Rev. Charles H. BRENT, President of the International Opium Commission of 1909.—xi + 434 pp. With 154 text figs. 1916. Yonkers-on-Hudson, New York: World Book Co. [Price $1·00.]

ii. **Moore's Manual of Family Medicine and Hygiene for India.** Rewritten by SPRAWSON (Cuthbert Allan) [M.D., B.S. (Lond.), M.R.C.P. (Lond.)]. With a Foreword by Sir Charles Pardey LUKIS, [M.D. (Lond.), F.R.C.S. (Eng.), K.C.S.I.]—Published under the Authority of the Government of India. Eighth Edition viii + 672 pp. With 69 text figs. 1916. London: J. & A. Churchill. [Price 6*s.* net.]

These two books are taken together for review because, in the matter of maintaining a healthy body and as an aid in urgent cases of illness far from medical help, they supply instruction and useful information to mankind from the earliest years of school life to the end of the allotted "three score years and ten." Although written in one instance for the children of the Philippines and in the other for adults in India their help and teaching will be equally valuable in any tropical continental region.

i. This primer is intended to teach young Filipinos to "take up the fight for clean well equipped towns and villages and for a sanitary life." It contains the elementary facts of anatomy, physiology and pathology in simple language suited to the simple thoughts and beliefs of the child. In the hands of careful teachers it should prove a very useful book and so hasten the time "when ignorance of the primary laws and facts of science will be looked upon as a defect" (Charles KINGSLEY). The illustrations are very numerous and thoughtless adults might call many of them "childish." That is, however, just what they are intended to be. Some children have photographic minds and take in knowledge easier through the eyes than through the ears.

In his "Introduction" Dr. Barrows, formerly Director of Education in the Philippines, points out that it is "harder for the inhabitants of tropical countries to keep strong and well than for people in other parts of the world." They have more disease bearing factors, organic and inorganic, to contend against. Owing to want of knowledge the Filipinos have for ages lived in insanitary surroundings and were afflicted with "many dreadful diseases." Of the bodies examined at the "Philippine Medical School," Manila, nearly all had "tuberculosis in some part of the body"; "nine-tenths had worms or other harmful animals in their intestines."

The chapter on the "Use and abuse of opium" is, on the whole fairly free from prejudice. The writer, however, forgets to mention that finance and personal interest had quite as much to do with Chinese objection to Indian opium, as moral principles.

ii. Fifty years ago there were, in India, Burmah and Ceylon, many Government "civil" servants and planters living far away from the doctor. To provide a book to help such persons the Government of India offered a prize which was won, in 1873, by General MOORE, I.M.S., with "Moore's Family Medicine and Hygiene for India."

The seventh edition was brought out by the reviewer, but the work entailed in editing such a volume is too much for one man and Major Sprawson has wisely made use of the best material written by workers with special knowledge, whose names are recorded in the "Preface." The eighth edition has been entirely remodelled and rewritten and will be "a very present help in time of trouble" and until the doctor comes.

J. H. Tull Walsh.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

Vol. 10.] 1917. [No. 5.

PROTOZOOLOGY.

Noeller (W.). Blut- und Insektenflagellatenzüchtung auf Platten. [The Plate Culture of Flagellates from Blood and from Insects.] —*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Feb.-Mar. Vol. 21. No. 4–5. pp. 53–94. With 1 plate.

By the use of media, of which the methods of preparation and employment are given in a section which is too long for reproduction here, the author has effected successful culture of many flagellates. Gut contents of insects were sown on specially prepared plates and in this way he has been able to obtain pure cultures. The various organisms which he has successfully cultivated by this method are described in considerable detail and the many advantages which result from possible developments along these lines are referred to.

The essentials of the technique are :—

Defibrinated horse blood was used throughout, both for tube and plate cultures. For tube cultures the following agar medium was found to be the best :—Agar, 25 ; grape sugar, 20 ; slightly alkaline horse-flesh broth, 1,000.

After preparation in the ordinary manner the agar was placed in the tubes, 3–5 cc. in each, and stored. When required the tubes were heated in the steamer or hot water till the agar was completely melted, an equal or double volume of the horse blood being added, and sloped. The cotton plug was then pushed down slightly and a rubber cork introduced. After setting of the medium the tubes were placed upright for a day or two in a 33° C. incubator, and thereafter those which proved sterile were kept in the ice chest.

For plate cultures the following agar was found the best :—Agar, 10 ; grape sugar, 10 ; slightly alkaline horseflesh broth, 1,000.

It was prepared a litre at a time as a precaution against loss of setting power from too prolonged heating. The unwashed ribbon agar with the grape sugar and bouillon were heated sufficiently long to dissolve the agar and then allowed to cool gradually to allow any impurities to sink ; clearing with egg white was not necessary. Next day the agar was again heated till thoroughly dissolved, and filtered through cotton wool and passed into sterile tubes 12–18 cc. in each. The tubes were placed in the steamer for 45 minutes on two successive days and stored.

When required the tube agar was dissolved in hot water, poured into a sterile mixing bottle, an equal amount of horse blood was added, and the whole well mixed by shaking and poured into Petri dishes (about 10 cm. diam. by not less than 2 cm. high). The plates were put to set in the ice chest, and inoculated as soon as set. The plates were incubated upside down, a layer of 1–2 mm. of solution of mercuric chloride, 2–3 per cent., being constantly maintained in the lid, and a fresh solution substituted each day. For high temperature incubation Petri dishes 3 cm. in height were useful because a deeper layer of sublimate solution could be maintained in the lid, and renewal was not necessary for several days.

The insect's gut was dissected out in physiological salt solution, examined under a low power to ascertain the presence of flagellates, and as small a portion as possible cut off and washed in several changes of sterile water to get rid of bacteria as far as possible. A drop of bouillon was placed on a slide and in this the infected portion of gut and on it a sterile coverslip. With sterile forceps the coverglass was pushed gently backwards and forwards, so as to release the flagellates from the gut and allow them to escape into the bouillon. 1 to 2 cc. of broth were next taken in a sterile syringe and a drop allowed to fall on one edge of the coverslip and fluid sucked up into the syringe at the opposite side of the coverslip. The syringe contents were shaken and the process repeated till as many flagellates were in the syringe as required. The syringe contents formed the material for inoculating plates, one or more drops being used for each plate, according to the number of bacteria present in the flagellate-containing gut. Separate colonies could then be obtained.

Two methods employed by the author for obtaining pure flagellate cultures free from bacteria out of infected tubes are described. The first was described by him in 1916. It depends upon the formation in such impure cultures of rosettes of flagellates which have strong adhesive properties. A drop of sterile broth is placed on a sterile slide and a drop of culture is placed in it. It is examined to observe if there are present rosettes in sufficient number; if so it is allowed to stand for 5–10 minutes. The slide surface is then gently washed with sterile salt solution or broth which removes most of the bacteria, while the flagellates remain fixed to the slide. It is examined to see that they are present and alive and if so they are taken up in the syringe and plated out as before.

The second is applicable to flagellates which do not adhere to the slide sufficiently to permit of the former procedure being successful. It consists simply in diluting a drop of rosette-containing culture in broth and with a fine capillary pipette fishing out under a low power of the microscope individual clumps of flagellates, and successively passing these through drops of sterile broth to wash off bacteria. Finally, they are placed in a large drop of broth and left for ½–1 hour when they separate and the drop can be plated.

Leptomonas fasciculata, *Leptomonas ctenocephali*, *Leishmania donovani*, *Crithidia melophagia*, *Trypanosoma theileri*, *Trypanosoma syrnii*, *Trypanosoma rotatorium* and *Schizotrypanum cruzi* were successfully cultivated by the methods given. The author had great difficulty in his efforts to separate *Crithidia melophagia* from a bacterium which he described under the name *Rickettsia melophagi*. Frequent subcultures at 22–25° C. caused relative increase of the flagellates as compared with the Rickettsia. At higher temperatures, 28–29° C., the Rickettsia predominated.

An interesting observation on the longevity of *Leptomonas ctenocephali* was made. A tube culture in dextrose—horseblood—agar was sealed with melted paraffin. After 21 months flagellates were still found alive and capable of movement, and successful subculture was carried out.

Experiments on animals were commenced and serological observations are recorded which the author intends to discuss more fully at a later date. The work of previous observers on culture of flagellates is referred to in dealing with the individual flagellates.

B. Blacklock.

YAKIMOFF (W. L.), SCHOKHOR (N. J.), KOSELKINE (P.M.) & PAROÏSKY (P. S.). **Maladies animales du Turkestan russe à parasites endoglobulaires.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 302–311.

The diseases are dealt with in four groups, viz. :—A., Piroplasmosis ; B., Theileriasis ; C., Nuttalliasis ; D., Anaplasmosis.

Descriptions of the parasites causing the diseases are given and the symptoms and signs produced by each. Piroplasma was found in cattle (*P. bigeminum*), in horses (*P. caballi*), in sheep, in goats, and wolves (? *P. canis*). With reference to the piroplasm of wolves which the authors of the section (Yakimoff and Schokhor) state resembles *P. canis*, they mention NUTTALL's intention to endeavour to infect wolves with this parasite.

B. Theileria was found in cattle (*T. mutans*), sheep (*T. ovis*), camels (*T. camelensis* n. sp.), and foxes.

C. Nuttallia was found in horses (*N. equi*) and donkeys.

D. Anaplasma was found in cattle (*A. marginale*), horses and dogs.

B. B.

DE MELO (Froilano), DE SÁ (Bras), DE SOUSA (Loreto), DIAS (Aniceto) & NORONHA (Rómulo). **Hématozoaires et pseudo-hématozoaires de l'Inde Portugaise.**—*Anais Sci. Fac. de Méd. do Porto.* 1917. Vol. 3. No. 3. 24 pp. With 2 plates.

The first section of this paper is occupied by short accounts of various protozoa discovered in the blood of animals by the authors. The first, a trypanosome first described by HANNA, was observed in the blood of pigeons (*Columbia livia*) and named by Melo *T. hannai.* No multiplication forms were found and the author suggests " Infective granules " as the means of reproduction. *Lynchia maura* was the only blood sucking ectoparasite found on the pigeons. *Trypanosoma lewisi* var. *longo-canadensis* [*sic*] was found in the blood of *Mus rattus.*

Haemoproteus columbae was studied and the term " Acton bodies " introduced for extraglobular forms found in the lungs. *Haemoproteus moruony* in the blood of *Copsicus saularis*, and a *Haemoproteus* in *Corvus splendens* and *Corvus macrorrhynchus*, are described, and a new species, *H. wenyoni*, from the blood of *Orthotomus sutorius.*

Brief notes on the following are given :—*Haemogregarina berestneffi* from *Rana tigrina*, *Leucocytogregarina francae* n. sp. from *Columba livia*, *Haemocystidium kopki*, n. sp., *Haemogregarina rodriguesi* n. sp., *Haemogregarina proencae* n. sp., *Proteosoma precox*, *Piroplasma canis*, and the incidence of *Plasmodium malariae*, *P. vivax* and *P. falciparum*. The second section deals with Anaplasma and *Paraplasma flavi genum*, neither of which is considered to be protozoan. The authors enumerate the animals in which they have found Anaplasma. They found the bodies in the blood of man and believe they are the first to make this observation. [PORTER (1915) mentions that SANGIORGI found Anaplasma in a child with infantile kala azar, and that she had observed similar bodies in anaemic children in England and in the blood of a man returned from the tropics.]

B. B.

ALEXEIEFF (A.). i. **Mitochondries et corps parabasal chez les Flagellés.**—*C.R. Soc. Biol.* 1917. Mar. 31. Vol. 80. No. 7. pp. 358–361. With 1 fig.

ii. **Mitochondries et rôle morphogène du Noyau.**—*Ibid.* pp. 361–363.

iii. **Nature mitochondriale du corps parabasal des Flagellés.**—*Ibid.* May 19. No. 10. pp. 499–502. With 1 fig.

iv. **Sur les mitochondries à fonction glycoplastique.** — *Ibid.* pp. 510–512.

v. **Sur la fonction glycoplastique du kinétoplaste** (= *kinetonucleus*) **chez les Flagellés.**—*Ibid.* pp. 512–514.

i. The group *Tetramitidae* Bütschli is divided by the author into :—

(1) *Tetramitidae* Bütschli emend., with two genera *Tetramitus* and *Costia*.

(2) *Embadomonadidae* with genera, *Embadomonas*, *Chilomastix* and *Fanapapea* (provisionally).

(3) *Eutrimastigidae* or *Trimastigidae*.

Mitochondria are constantly present in various Polymastigines and more especially in the family *Trimastigidae*. The author considers a study of their occurrence in the Protomonadina to be now necessary. He proceeds to discuss the matter and notes their occurrence and significance in the following genera :—*Trypanosoma*, *Bodo* (*syn. Prowazekia*), *Cryptobia* (*syn. Trypanoplasma*) with subgenus *Trypanophys*, *Bicosoeca*, *Prowazekella*, *Tetramastix*, *Monocercomonas*, *Polymastix*, *Embadomonas*, *Chilomastix*, *Protrichomonas*, *Eutrichomastix*, *Trichomonas*, *Hexamastix*, *Octomastix*, and *Octomitus*.

ii. The author has convinced himself that differentiations in the cytoplasm of various Protista studied by him are all due to mitochondria originally. Unicellular or multicellular organisms are alike in that they produce substances of very varying constitution (chlorophyll, starch, glycogen, fat, etc.); the origin of these substances is traced to mitochondria, which in turn arise from the nucleus. Mitochondria are, he affirms, chromosomes or chromidia which tend to change their nature by a process of simplification. The granules in *Blastocytis enterocola*, flagella and cilia all are nuclear in origin. In the case of cilia and flagella the Parabasal body, itself a derivative of the nucleus, acts as intermediary.

iii. The author deals briefly with the arrangement of the mitochondria in various genera of flagellates. Mitochondria are not rare among the Protozoa; they are present chiefly as granules sometimes scattered throughout the protoplasm but more frequently localised in definite regions, for example: in Tetramastix, Prowazekella, certain Eutrichomastix and Hexamastix the mitochondria are perinuclear; in Cryptobia, *Trichomonas batrachorum*, *T. muris* the granules are along the origin of the undulating membrane; in *Eutrichomastix motellae*, *Trichomonas augusta* the granules are endoaxostylar. A fourth arrangement is the condensation of the granules into a parabasal body. He proceeds to discuss his reasons for considering the parabasal body to be of mitochondrial character. The function of the parabasal body is elaboration of material which subserves the activity of the flagella.

iv. ARNOLD's work on mitochondria in the cartilage cells of frogs is mentioned and the fact that glycogen was found in the tissue where mitochondria were present. The author also refers to his own observations on the formation of glycogen in the spores of *Blastocystis enterocola* Alexeieff. The parabasal body has a glycoplastic function. In *Bodo edax* the presence of glycogen droplets in the kinetonucleus can be demonstrated easily by using Lugol's solution.

v. This paper consists of arguments, based on staining reactions, that the kinetonucleus has a glycoplastic function and that it is of mitochondrial nature.

B. B.

SANGIORGI (Giuseppe). **Flagellati nell' intestino umano.**—*Pathologica.* 1917. July 15. Vol. 9. No. 208. pp. 193–196. With 2 figs.

The author describes the characters of two intestinal flagellates which he cultivated in peptone water by the method described in a previous paper [this *Bulletin*, Vol. 9, p. 393]. The first organism remained alive for more than two months, showing a recurring cycle of rapid vegetative growth followed by encystment. Subculture was not successful. The organism, 9·6μ to 32μ by 4μ to 17·6μ, has four anteriorly placed free flagella, a cytostome, no undulating membrane, and no backward directed flagellum. The author places it in MACKINNON's subgenus Tetratrichomastix, and names it *T. intestinalis.*

The second organism grew well in culture and was carried through ten successive generations by subculture at weekly intervals. It is a biflagellate of semilunar shape, 6μ to 9·6μ by 1·6μ to 4·8μ, closely related to the Bodonidae, but the author considers its shape so characteristic that he proposes the subgenus *Toxobodo* for it, and calls it *T. intestinalis.*

B. B.

ESCOMEL (E.). **Quelques remarques à propos des trichomoniases intestinale et vaginale.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 553–557.

The reactions of *T. vaginalis* towards therapeutic agents as studied *in vitro* are the same as those of *T. intestinalis.* A 1 per 1,000 solution (freshly prepared) of metallic iodine kills both instantly. Where the examination of vaginal secretion reveals the presence of Trichomonas even in small numbers two-litre vaginal injections are given night and morning. After these injections a further injection of glycerine-iodine 1-2,000 is given which is retained as much as possible by a wool plug. Still better is the practice of painting carefully the whole of the mucous membrane and its folds with a swab of glycerine iodine. The author now divides *Trichomonas intestinalis* into two races, i.e., resistant to turpentine and non-resistant to turpentine. The former strain is treated by injection of iodine solution 1 per 1,000. Three days' treatment suffices, the author states, to produce cure of trichomonas vaginitis or to cause the disappearance of *T. intestinalis*. Where this remedy does not cure he advises that search be made for possible sources of reinfection.

B. B.

OHIRA (Tokuzo) & NOGUCHI (Hideyo). **The Cultivation of Trichomonas of the Human Mouth** (*Tetratrichomonas hominis*).—*Jl. Experim. Med.* 1917. Feb. Vol. 25. pp. 341-347. With 4 plates.

The authors refer to the work of LYNCH [this *Bulletin*, Vol. 7, p. 88], who cultivated trichomonads from the gums and vagina, in neutral and acid bouillon.

Material for culture was obtained from tartar from the mouth and numerous media were tried with results which were good in relatively few cases. A mixture of ascitic fluid and Ringer's solution in equal parts gave entire satisfaction. Undiluted ascitic fluid was found to be too rich in protein, although in this respect it is more suitable than bouillon. Tubes were inoculated with a small amount of dental tartar and placed at a temperature of 37° C., and every 24 hours a small quantity of the culture was transferred to new medium. In four or five days no difficulty was experienced in finding quantities of agglomerating flagellates as well as free individuals in every field. Transfer was effected by means of a capillary pipette, the culture being taken up from the bottom of the tube. At lower temperatures both bacteria and protozoa grow more slowly, and transfer may be made every 48 hours.

A note on *Entamoeba gingivalis* (Gros) follows. This organism is almost always encountered in the cultures and remains alive for over 24 hours; by keeping the medium always at 37° C. and by having a sufficient amount of culture fluid the amoeba sometimes lives 48 hours. Increase in the rapidity of growth of the entamoeba, accompanied by a corresponding decrease in the rapidity of growths of the trichomonas, is caused by reducing the alkaline reaction of the medium to almost the neutral point as indicated by litmus paper, by adding drops of 1 per cent. solution of acetic acid. By transferring the sediments into a new, already heated medium once every 24 hours the amoebae can be kept alive over a week; in one instance they were kept alive as long as 10 days. Multiplication of the amoebae took place though not so strikingly as in the case of the trichomonads.

A description of the morphological and biological properties of the culture Trichomonas is given.

The authors conclude their discussion and summary as follows:—

"In the light of modern investigations there are five subgenera to be included under the genus *Trichomonas* Donné. They are as follows:—

"(1) *Protrichomonas* Alexeieff, with three anterior flagella, without an undulating membrane.

"(2) *Trichomastix* Bütschli, with three anterior flagella and a trailing flagellum (*Schleppgeissel*), without an undulating membrane.

"(3) *Trichomonas* Donné, with three anterior flagella and an undulating membrane.

"(4) *Macrostoma* Alexeieff, amend, Wenyon, with three anterior flagella and an undulating membrane wedged in a deep groove (peristome).

"(5) *Tetratrichomonas* Parisi, with four anterior flagella and an undulating membrane.

"As far as our culture trichomonas from the human mouth is concerned, it has been shown that it is not strictly a Trichomonas and that it should be classed under the subgenus *Tetratrichomonas.*"

B. B.

YAKIMOFF (W. L.). **Trichomonas de l'intestin de la sangsue du Turkestan** (*Limnatis turkestanica*).—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 293–294.

A brief description of *Trichomonas ninae kohlyakimovi* found in the gut of the leech. Vegetative forms and others considered to be the corresponding cysts are noted. Blastocystis and amoebae were also present.

B. B.

BLANC (Georges). **Sur un cas de toxoplasmose canine observé en Tunisie.**—*Bull. Soc. Path. Exot.* 1917. May. Vol. 10. No. 5. pp. 377–378.

Two dogs were inoculated with ground up nymphs of ticks collected from a dog experimentally infected with canine kala azar. One of the dogs became ill, wasted, and developed double corneal opacity in less than a month. Five weeks after inoculation it was killed, but neither Leishmania nor Toxoplasma was found. The other dog died a month after inoculation without having appeared ill. In the organs Toxoplasma was found, but no Leishmania. The dog from which the nymphs were collected was then killed but no Toxoplasma was found, although Leishmania was present. The author suggests three hypotheses for this, the first recorded case in Tunis of dog toxoplasmosis.

(1) A natural infection of the dog with Toxoplasma, existing before its inoculation.

(2) The inoculation of the nymphs was the cause of the infection.

(3) Larvae from a part of the building where gondis were kept may have infected the dog. Natural infection of the gondis kept there has been observed regularly for several years in autumn and winter.

B. B.

SMITH (Theobald) & SMILLIE (Ernest W.). **Note on Coccidia in Sparrows and their Assumed Relation to Blackhead in Turkeys.**—*Jl. Experim. Med.* 1917. Mar. Vol. 25. No. 3. pp. 415–420.

In connection with researches into the condition of blackhead in turkeys, the authors investigated the occurrence in sparrows of Coccidia. The methods used were examination of scrapings of the duodenal mucosa for sexual stages, examination of the rectal contents for oocysts, and culture on agar of rectal contents. From July 12th, 1916 to January 1917 fifty-four birds were examined and coccidia were found in 43. All the sparrows were adults. Sections of intestine were made and showed a variable intensity of infection in the duodenum and little if any further down. The total absence of the asexual stage in the cases studied is noted, and it is suggested that if not eliminated or suppressed, it had already been completed in the early life of the birds. The parasites found belonged to the genus Isospora or Diplospora and not to Eimeria.

B. B.

ARAGÃO (Henrique de Beaurepaire). **Pesquisas sobre o** ***Haemoproteus columbae.*** [Researches on *Haemoproteus columbae*].—*Brazil Medico.* 1916. Nov. 4 & 11. Vol. 30. Nos. 45 & 46. pp. 353–354 & 361–362.

The author states that in Brazil the transmissors of *Haemoproteus columbae* are *Lynchia lividicolor* and *Microlynchia pusilla.* As in other species of Lynchia the development proceeds in these species as far as the reduced ookinete stage. In the mosquitoes *Culex taeniorhynchus, Culex confirmatus* and *Cellia argyrotarsis* the evolution goes as far as an ookinete which, however, does not reduce. The author has not been able to communicate the organism from these insects to birds. In *Dermonyssus avium* the evolution of Haemoproteus is easy up to the ookinete stage. The zygotes formed accumulate in the digestive tube of the insect, and lose their mobility, but do not diminish in size, and when stained by Giemsa appear more red, the older they are. The transmission of the parasite is not obtained by the bite of Dermonyssus, nor by the injection of emulsions of the insect into healthy birds. Nor does it develop in *Argas persicus* or *Ornithodorus moubata,* the ingested parasites rapidly altering in the digestive tube. In the regular transmissors of Haemoproteus the mature gametes are the only ones which are fecundated and develop. The time required for development in Lynchia is five days, the inoculation of pounded insects before this date into birds being absolutely unsuccessful. Specimens of Lynchia which are made to bite a pigeon for three successive days completely lose the power of infecting new birds. The author's observations of the development of Haemoproteus agree with those of SERGENT and GONDER. The formed zygote is only in a condition for transmission after having suffered reduction, and after having expelled all, or nearly all, its pigment, the reduction consisting in the formation of two small spheres of protoplasm charged with pigment, which are expelled from the body of the parasite, a process which takes place on the fifth day after infection of the bird. The reduced ookinete is only one-half of its previous size. The author cannot confirm the observations of ADIE [this *Bulletin,* Vol. 6, p. 189].

The inoculation of birds with emulsion of infected Lynchia which has been filtered through a Berkefeld filter, is found to be unsuccessful. Healthy birds bitten by Lynchia, or inoculated with emulsions, are infected without fail, but a bird once infected is proof against further infection. The inoculation of the blood of an infected pigeon into another bird does not infect, though the parasites may be observed transiently in the blood of the inoculated bird up to the eighth day, and the bird remains susceptible to infection in the regular way by insect-bite. The author cannot confirm the observations of GONDER with regard to the inoculation of birds by zygotes artificially obtained through the addition of salt solution to birds' blood or by defibrination. The author then proceeds to describe the development of Haemoproteus in the body of the pigeon, very much as it is given in the text-books.

Haemoproteus orizivorae develops very much like *H. columbae*, forming cysts in the brain, liver and spleen. The author has also found similar cysts in a pigeon, *Columbagallina talpacota*, and in *Chanthornus jamaicai.* The development seems to be identical in all species. Attempts to transmit Haemoproteus from pigeons to other birds, either by bite or by inoculation of Lynchia have, in the author's experience, always failed.

J. B. Nias.

SERGENT (Etienne). **Sur des formes sans pigment ou à pigment très fin apparues chez le** *Proteosoma* **(***Plasmodium relictum* **Grassi et Feletti) au cours de passages par canaris.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 448–450. With 2 text figs.

The author describes forms of Proteosoma without pigment or with very fine pigment which he observed in three canaries out of a series of 700. Intraperitoneal injection of blood containing such parasites into three fresh canaries resulted in the occurrence in the latter of similar forms. In two of these inoculated birds the ordinary pigmented form of Proteosoma was also present. Details of the course of the infections are given. This observation is considered by the author to favour LAVERAN's theory of the unity of the parasite of human malaria.

B. B.

SERGENT (Etienne) & HEMPL (H.). **Sur l'immunité dans le paludisme des oiseaux (***Proteosoma* **vel** *Plasmodium relictum* **Grassi et Feletti).**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 550–552. With 1 fig.

A test inoculation (intraperitoneal injection of parasitized blood which infected controls with certainty) fails to cause the appearance of parasites in the peripheral blood of birds which have got over an acute infection. This relative immunity was found to be still present in four out of five canaries at least two and a half years after the original infection. The fifth developed an infection of exceptional severity.

B. B.

SHORTT (H. E.). **Notes on Two Haemogregarines of Cold-Blooded Vertebrates.**—*Indian Jl. Med. Res.* 1917. Jan. Vol. 4. No. 3. pp. 402–413. With 2 coloured plates.

Twenty-five per cent. of lizards (*Agama tuberculata*) collected at Kasauli during July, August and September, 1916, were infected with the haemogregarine which is described in the first part of this paper. Large forms 17·5μ by 3·5μ, small forms 5·25μ by 3·5μ, intermediate forms 13·5μ by 3μ are described from the peripheral blood and also large free forms liberated probably by mechanical damage to the host cells in making the films. The host erythrocytes showed increase of size if the parasite were large, peripheral displacement of the nucleus in most cases, but no loss of staining reaction or haemoglobin. Parasites freed from the host cells exhibit motility which is described in detail.

Schizogony forms were not seen in the peripheral blood, but were found in the endothelial cells in the lung capillaries. Forms of encysted schizonts 21·5μ by 14·5μ with 16 merozoites and forms 25μ with as many as 40 merozoites are described. The smaller cysts being commoner than the larger (50 to 1). Attempts to cultivate the parasite by BASS's method failed as did also efforts to secure transmission by means of *Phlebotomus*.

The second haemogregarine is named *Haemogregarina nucleo-bisecans* on account of a longitudinal fissuring of the host cell nucleus which frequently occurs and is attributed to the pressure effects of the parasite. This haemogregarine was found in *Bufo melanostictus* and other toads in the plains of India. Material obtained during July, August and September, 1913 and September 1916 showed 90 per cent. infection (many hundred toads). Many heavy infections occurred, one in every four red cells being parasitized. A description of the various forms follows.

B. B.

LEGER (M.) & MOUZELS (P.). **Hémogrégarine intraleucocytaire d'un saurien,** *Tupinambis nigropunctatus*.—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 283–284.

In the blood of a lizard in Cayenne the authors discovered a haemogregarine to which they give the name *H. weinbergi*. The parasite is contained in a thin walled cyst, and has the form of a vermicule with the tail folded on itself. It measures, as found in the white cells (mononuclear), 9 to 11μ, but if unfolded would measure 16 to 18μ. No parasites were found in the erythrocytes nor free in the plasma, and no forms of multiplication were discovered either in blood or in smears from the spleen, liver, lungs and kidneys. Reference to previously described haemogregarines in white cells is made.

B. B.

DIMOND (Lyn). **Trench Fever, or P.U.O., associated with the Presence of a Haemogregarine.**—*Lancet.* 1917. Sept. 8. pp. 382–384. With 8 figs.

Dimond has studied the blood in 12 cases of Trench Fever, eight of which belonged to the Class A of MCNEE, RENSHAW and BRUNT and four to Class B.* He describes his technique and the strict precautions taken to ensure freedom from contamination in making his preparations. The cutaneous blood was investigated by thin and thick film methods, the venous blood by the same methods and by examination of the deposit obtained by prolonged centrifugation (1½–2 hours) of citrated blood haemolysed by means of Saponin (2 cc. of venous blood syringed into a solution of 1·8 per cent. sodium citrate, and 2, 3, or 4 cc. of a 0·5 per cent. solution of saponin added). The blood obtained by puncture of the liver, spleen and lung was examined. In six cases cerebrospinal fluid was examined and in certain cases puncture of enlarged lymphatic glands was done. A rapid method of staining is described.

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* *Journal of the Royal Army Medical Corps.* 1916. April.

The author discovered in the venous blood, and blood from the liver and lung punctures of the 12 cases a haemogregarine resembling *Haemogregarina gracilis* described by WENYON from *Mabuia quinquetaeniata.* In the lymphatic glands the parasite was found rarely and with difficulty; the cerebrospinal fluid was negative.

Incidentally the interesting fact was noted that removal of 10–12 cc. of cerebrospinal fluid caused marked and lasting relief from the shin pain, and pain in the spleen.

A description of the various stages of the parasite seen at different periods and in different organs is given. The terminology is a little difficult to follow but the following appears to represent the authors findings.

In venous blood. Before the fever.—Macromerozoites 7–13μ free in plasma; micromerozoites 3–4μ encysted, and in red cells, or free; sausage shaped forms free or encysted 4–6μ by 3–4μ, nucleus consisting of piriform masses of chromatin; other sausage shaped bodies with nucleus in form of a ring. The above forms increase in number up to the height of the fever and then disappear.

The day after the fever.—Non-pigmented parthenogenetic gametocyte only found; round oval or triangular in shape measures 4–6μ by 3–5μ in early stages, its nucleus divides into 2, 4, 8, 20 and then sporulation occurs, 20 small merozoites being liberated; the gametocyte at time of sporulation measures 13–15μ. Micromerozoites also develop by a process of schizogony. Merozoites develop asexually with production of a second type of schizont in liver. Male and female gametocytes are found in liver and occasionally in venous blood.

B. B.

YAKIMOFF (W. L.) & SCHOKHOR (N. J.). **Leucocytogrégarine des chiens au Turkestan russe.**—*Bull. Soc. Path. Exot.* 1917. Apr. Vol. 10. No. 4. pp. 281–282.

A list of described species of leucocytogregarines in dogs with the authors who have observed them is given and then a table of the authors' findings in 151 dogs in various districts in Turkestan. The parasite was present in 9·9 per cent. of the dogs. A short description is given of the parasite which the authors consider to be *Leucocytogregarina canis* James.

B. B.

LEGER (M.) & MOUZELS (P.). **Piroplasme et microfilarie d'un Edenté, le *Bradypus tridactylus* Linné.**—*Bull. Soc. Path. Exot.* 1917. Mar. Vol. 10. No. 3. pp. 173–176.

Bradypus tridactylus sometimes harbours in its blood a microfilaria; the authors found that one which was captured at St. Jean du Maroni contained *Mf. Kerandeli* Brimont, and in addition had its red corpuscles infected by a protozoal parasite belonging to the genus Theileria. A description of the various forms encountered is given with measurements. Marginal points were looked for but not discovered. An Ixodid tick (*Amblyomma varium*) was found on the edentate.

B. B.

DE RAADT (O. L. E). **Nähere Untersuchungen über die Systematik des *Ovoplasma anucleatum*.** [Recent Investigations on the Classification of *O. a.*]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Apr. Vol. 21. No. 8. pp. 133–138. With 4 figs. & 1 chart.

The author reconsiders here the organism which he found in the spleen in certain cases of fatal fever in Borneo and Java, and which he described in 1909. Von PROWAZEK considered it to be protozoal but the author in giving a further description of it considers it probable that it belongs to the Blastomycetes. The description is as follows. It varies in size from the smallest dimensions to 3μ and occurs in the spleen. The smallest forms are coccus like, medium forms have a small vacuole, large forms a large vacuole. Sickle shaped forms are common. Differentiation between protoplasm and nucleus is not observable, there is no pigment. Multiplication by budding and division is described. The parasite occurs in large mononuclear leucocytes, rarely in erythrocytes, very rarely free in the blood plasma. It was never found in the peripheral blood. Stained by Giemsa's stain no trace of chromatin could be seen and only rarely when using Heidenhain's stain could nuclear elements be observed as minute dots; the organism is Gram positive. It is not known whether this organism occurs in other organs than the spleen, whether it can be cultivated or successfully inoculated into animals nor how it obtains entry to the human body.

B. B.

CHATTON (Edouard). **Les "Blastocystis" stades du cycle évolutif de flagellés intestinaux.**—*C.R. Soc. Biol.* 1917. June 2. Vol. 80. No. 11. pp. 555–560. With 1 plate.

The author studied the faeces of geckos, *Tarentola mauritanica*, which are almost constantly and in many cases very heavily infected with Blastocystis. As a result of his observations he does not agree with ALEXEIEFF that this organism is in any way related to the yeasts. The central clear area does not in the author's opinion contain glycogen, as he was never able to obtain its reactions; he holds its content to be a protein. During the course of investigations extending over a long period and involving the examination of 400 geckos which were carriers of the so-called Blastocystis, the author was able to observe the following sequence of events in three cases. The cortical syncytium of the microspheres thickens and the nuclei become more evident. Between the nuclei furrows (sillons) develop, which limit areas of a regular polygonal shape giving the microsphere the appearance of a blastula with pavement-like covering. The cells project into the central cavity, so much so that in small forms the cavity is completely obliterated. In large forms there is always a portion of this cavity uninvaded. The cells derive their nourishment from the dissolved contents of this cavity. In these large forms close observation of the cavity reveals the presence of flagella whose relationship to the cells is difficult to determine. At a further stage the whole sphere disintegrates rapidly, liberating small flagellates, of ovoid shape which on their escape swim actively. These flagellates are of the Bodo type but have no paranuclear body. They have a forward and a trailing flagellum. These observations enable the author to state that Blastocystis is a stage in the cycle of evolution of a flagellate belonging to the Bodonidae. He proposes the name mastigont for the micro-spheres and for the flagellate stage the name *Schizobodo*. The species from the Gecko would be named *Schizobodo tarentolae*.

B. B.

SWELLENGREBEL (N. H.). **Observations on *Blastocystis hominis*.**—*Parasitology*. 1917. July. Vol. 9. No. 4. pp. 451–459. With 2 plates.

The author gives a historical account of the views held as to the significance of *B. hominis*. An investigation into the life-history of this organism leads him to the following conclusions :—

"1. In two cases *Blastocystis* was found where the presence of *Trichomonas* or *Chilomastix* could be excluded with absolute certainty. Consequently *Blastocystis* cannot be a normal developmental form of either.

"2. In fresh stools *Blastocystis* is but seldom found to be alive and even when encountered in this state it dies quickly. After death the central sphere soon disappears.

"3. The size of blastocysts varies greatly and the larger they grow the smaller becomes the peripheral fringe of cytoplasm. Living blastocysts are relatively small and rich in cytoplasm.

"4. The blastocysts of the cases mentioned here, although having some general characters in common, differed much as to details of structure. This difference was especially marked when the associated parasites were different. No blastocysts were found without an associated parasite.

"5. The occurrence of blastocysts in the stools of a man fed on milk and eggs only, and the presence of living blastocysts in the man's stools, exclude the idea of their being remains of solid food.

"6. It is probable from the observation recorded in this paper, that "*Blastocystis*" is not the name of a zoological genus but of a peculiar form of degeneration to which representatives of different genera of intestinal protozoa may be liable. The resemblance seen in blastocysts from different sources which may lead to their being regarded as belonging to one species, is easily explained by a convergence resulting from the parasites which produce the blastocysts losing their characteristics during the process of degeneration.

"7. No certain stages of sporulation were seen, as described by Alexeieff, and the nuclear structure, although variable, never resembled that given in his description. It is therefore probable that Alexeieff's *Blastocystis enterocola* is different from the forms described in man under the same name."

B. B.

SLEEPING SICKNESS.

JACK (Rupert W.). **Natural Transmission of Trypanosomiasis (*T. pecorum* Group) in the Absence of Tsetse-Fly.**—*Bull. Entom. Res.* 1917. Aug. Vol. 8. Pt. 1. pp. 35–41. With 2 maps.

Observations in Southern Rhodesia during the past seven years have convinced the author that transmission of *T. pecorum* may occur in the absence of tsetse-fly and that such transmission has occurred more frequently than has been generally recognised.

Details are given of six epidemics which could not be attributed to Glossina. It was observed that in all these cases the outbreak attained its height during the spring and summer months (October-April). In no instance was a recrudescence of the disease observed in the following season, although susceptible animals were kept in the same locality. Infection occurred only amongst animals which were herded together.

The author writes that from the foregoing it appears probable :—

" (*a*) that the transmitting agent or agents are abundant in the spring and summer and disappear or decrease greatly in number in the winter ;

" (*b*) that the disease is not readily transmissible under Southern Rhodesian conditions by these agents from chronic cases that live over until the rains or recover ;

" (*c*) that the agents concerned in this method of transmission are not capable of perpetuating the disease indefinitely, or are only capable of doing so under exceptional circumstances ;

" (*d*) that the method of transmission is of a mechanical and not of a cyclical nature ;

" (*e*) that the segregation of infected animals (on showing temperature) would in the absence of tsetse effectively check the spread of the disease."

The most probable agents are included in the following : *Tabanus fuscipes*, *T. taeniola*, *Haematopota pertinens*, *Haematopota* spp., *Stomoxys calcitrans*, *Lyperosia* and mosquitoes ; of these only mosquitoes and *S. calcitrans* are everywhere abundant throughout the season over which infection extends. It is however not necessary to infer that the power of mechanical transmission is confined to one species or to one family.

In no instance as yet recorded in Southern Rhodesia can Glossina be definitely disassociated from the inception of the outbreak. Herding of " fly-struck " cases with healthy animals is, however, a practice attended with danger, especially in the spring and summer months.

W. Yorke.

DELANOË (P.). **Contribution à l'étude du pouvoir pathogène du Trypanosome de Mazagan.**—*Bull. Soc. Path. Exot.* 1917. June. Vol.. 10. No. 6. pp. 501–512.

The author has examined the pathogenicity of the trypanosome of horses of Mazagan [this *Bulletin*, Vol. 6, p. 377].

Rabbits.- Seven were inoculated and all became infected. All succumbed after periods varying from 2 to 11 months. The phenomenon of auto-agglutination of the red blood cells was well marked. Stress is laid on cutaneous lesions which occur in the nares, eye lids, ears, external genitals and elsewhere. The eye itself was not attacked and keratitis was never seen. [In the reviewer's experience such lesions are commonly seen in rabbits infected with any of the more important mammalian trypanosomes and are in no way specific.]

Guinea-pigs.—Four were inoculated and all became infected. In three of these the disease terminated fatally after 36 days, 5 months and 4 months, respectively; the fourth animal was alive and well at the end of four months, when the author left Mazagan. The external lesions in these animals are less generalised than in the rabbit; some oedema of the external genitals was noted.

Dogs.—These animals were very susceptible to infection; in them death occurred in from two to four months. In one of the animals there developed a double interstitial keratitis. Various other symptoms are described.

White Mice.—The incubation period was in these animals 2 to 9 days and the duration of the disease 6 to 36 days.

White rats.—Two of these animals died 18 and 23 days respectively after inoculation.

Mus alexandrinus.—Four were inoculated; three died after an acute infection; in the fourth the course was chronic.

Gerbils (*Meriones shawi*). Three of these animals were inoculated and became infected.

Two cocks and two geese resisted repeated inoculations of massive doses.

W. Y.

DELANOË (P.). **De l'existence à Mazagan et dans le Cercle des Doukkala (Maroc Occidental) de *Trypanosoma lewisi* Kent et de *Trypanosoma duttoni* Thiroux.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 456–458.

Of 44 rats (*Mus alexandrinus*) captured in Mazagan in December, 1916, 11 (25 per cent.) were infected with *T. lewisi*, whereas none of 30 gerbils (*Meriones shawi*) were found infected. As these animals exist together in the same neighbourhood the author asks the question whether the latter are susceptible to infection with *T. lewisi.* Two gerbils were inoculated intraperitoneally with the blood of a naturally infected rat; in the first there was a slight multiplication of the parasites in the peritoneal cavity, but no invasion of the blood stream and in the second a considerable multiplication in the peritoneal cavity and a transient invasion of the blood stream.

T. duttoni (Thiroux) is found in Mazagan much more rarely than *T. lewisi.* In 1915 this trypanosome was found in a grey mouse and in December 1916–January 1917 43 grey mice (*Mus musculus spretus*) were examined and one animal found infected. A brief description of the parasite is given; all of seven grey mice inoculated became infected.

W. Y.

ROUBAUD (E.). **Histoire d'un élevage de *Glossina morsitans* à l'Institut Pasteur de Paris.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 629–640. With 2 figs.

In December 1913 the author brought back to Paris from Senegal a number of pupae of *G. morsitans* and *G. palpalis.* Only two *palpalis* hatched and both were males, but from the *morsitans* pupae two males and six females hatched. Of the six females only one gave birth to descendants, the remainder proving sterile. The female in question produced four normal pupae between 17th February and 18th March, 1914, and since this time the breeding has continued regularly.

The breeding experiments were carried out at a mean temperature of 25°–27° C. and a mean humidity of 50–55 per cent. Experience showed that it is essential to arrange for the renewal of the air in the incubator, otherwise the flies will not develop and many of the pupae will not hatch. A temperature of 32° C. caused heavy mortality amongst flies and pupae, as many as 50 per cent. dying. A description is given of the muslin cases in which the experiments were carried out.

The flies were fed on guinea-pigs and rabbits. They never fed on anything other than blood. At the temperature of the experiment the males, and females during the period when they were depositing larvae, fed daily although as a rule the females refuse to bite the day before the expulsion of a larva. Non-fertilised females and those which are not bearing larvae fed less frequently. The flies fed equally well on the fowl, guinea-pig and rabbit.

With reference to the length of life of the flies the author found that during 1914 (the first year of the experiment) of 13 females five lived less than 1 month, four lived 2 months, two 3 and 3½ months, two 4 and 4½ months and one 5½ months. During the second year of breeding of 6 females followed four did not live longer than 2 months, one died in 3 months and one in 5 months and 3 days.

Copulation took place shortly after the birth of the females. The first larva was as a rule deposited 15 to 20 days after copulation and the larvae continued to be born in a regular manner every 9 to 11 days as is shown in a table. The majority of the flies did not give birth to more than five larvae. In 1914 of the 13 females observed eight did not reach this number and the other five exceeded it; in 1915 four of six females followed gave birth to less than five larvae. Some females for unknown reasons were sterile. The duration of pupation was on an average 30 days.

During the first two years of the experiment the proportion of males and females born was equal but towards the end of the third year the number of males greatly exceeded that of the females; during September 1916 of 16 Glossina which hatched 15 were males. Whatever was the reason for this decrease in the proportion of the females it was the chief cause of the collapse of the breeding experiment. Attempts were made to infect the laboratory fed *Glossina morsitans* with *T. rhodesiense* and *T. brucei* of Uganda. Three experiments with 15–20 flies were undertaken but with no success.

Experiments were made to ascertain the action on the pupae of *G. morsitans* of *Nasonia brevicornis* which parasitises the pupae of various flies in the United States in Australia and in Europe. The result was positive. The Chalcidian deposited its eggs in the pupae of *Glossina* as easily as in those of the *Calliphora* which it habitually parasitises. However those individuals developed in the interior of the pupae, although they killed the Glossina, could not themselves emerge from the thick-walled pupa on reaching the adult stage and consequently were themselves killed. The author concludes by emphasising the fact that he has been able to rear *G. morsitans* in a

Parisian laboratory for over three years and suggests that the fact that this has been shown to be possible will render practicable the solution of many obscure problems in the life history, and pathogenicity of these insects.

W. Y.

MARTY (L.). **De la Pseudo-Agglutination des globules rouges dans quelques affections à parasites sanguicoles.**—*Bull. Soc. Path. Exot.* 1917. June. Vol. 10. No. 6. pp. 484–486.

In trypanosomiasis the red cells agglutinate by subsidence of the rouleaux and form masses of a mahogany colour surrounded by globulids [see this *Bulletin*, Vol 10, p. 53]. In other blood infections (spirochaetes and malaria) and to a less extent in filariasis and amoebiasis an analogous phenomenon is seen but it is less definite and for this reason is called " pseudo-agglutination " of the red corpuscles. In a preparation which is too thin the latter phenomena is not seen, but in thick preparations the red corpuscles form small pools more or less independent of one another.

Preparations must be carefully made ; the drop of blood should be of moderate size, the coverslip should be placed on the drop by means of forceps, and light and uniform pressure only should be exerted on the slip so as to spread the drop without crushing it.

The macroscopical appearance of such preparations exhibits nothing peculiar. Microscopically the rouleaux are slightly shortened but show no superposition. The outline of the individual cells of the rouleaux is not perfect. In the region of the haemo-lute the rouleaux are a little deepened in colour and tend to run together and have a glazed appearance. On light pressure the rouleaux disintegrate, without re-forming, into specks of mahogany colour. This is very similar to the appearance seen in very mild infections of trypanosomes. The character of the haemo-lute is of no great assistance in diagnosis in the absence of the formation of strata and undulations found in typical trypanosomiasis, since in slight affections of the latter the haemo-lute is formed exclusively of red cells free in a haemoglobin tinted serum.

If with the aid of a platinum wire a drop of 1 in 1,000 solution of potassium carbonate is run under the coverslip it is found that the haemo-lute in a trypanosomiasis preparation resists its action whilst that of a preparation exhibiting pseudo-agglutination is instantly disorganised. The lemon yellow agglutinats of doubtful character seen in mild cases of trypanosomiasis become more definite and of a mahogany tint.

In conclusion the phenomenon of " agglutination -disagglutination " permits of a diagnosis in most cases of trypanosomiasis without difficulty. In slight cases it is necessary to try the effect of treatment by atoxyl, which in trypanosomiasis increases the phenomenon of " agglutination —disagglutination " but has no effect on the " pseudo-agglutination " of allied affections ; or still more simply the impregnation of the preparation with a 1 in 1,000 solution of potassium carbonate, which by increasing the agglutinating power of the red cells permits of a differentiation between the slight agglutination of mild trypanosomiasis and pseudo-agglutination due to another parasite.

W. Y.

YAWS.

CEYLON. **Report on the Treatment of Yaws (or Parangi) by Intravenous Injection of Various Preparations of Arsenic.** [KURIEN (C. G.), Medical Officer].—MS. Report to the Colonial Office, dated Aug. 27. 1916.

Dr. Kurien, working at Dambulla, Ceylon, has treated over 3,000 cases of yaws (or parangi) by intravenous injection of salvarsan, arseno-benzol, kharsivan, arsenious iodide and arsenious iodide with mercury.

Salvarsan, arseno-benzol and kharsivan were almost equally effective therapeutically. Primary sores were only occasionally seen. Secondary lesions began to heal about 48 hours after treatment, while "yaws eruptions on hands and soles and other secondary lesions of ringworm-like, eczematous, pemphigeal and furfuraceous type, heal up in from three days to three weeks." Tertiary changes take from three months to six or nine months before any permanent benefit is effected so far as could be ascertained. Ulcers have reappeared in 8 per cent. of the number of cases treated with salvarsan or allied product "within a year after the original injection for tertiary lesions, which latter had been cured to all appearances, in the first instance." 11 per cent. of secondary and tertiary cases out of the 2,425 treated returned with fresh lesions and the author thinks that possibly more may return. The people of Dambulla are about the poorest in Ceylon.

More detailed results of the arsenious iodide treatment are also given. Two series of cases are tabulated. In the first series, 183 patients were treated, one to six injections being given. In 41 cases no change was observed owing to the patients not remaining under observation for a sufficiently long period; 98 had their condition ameliorated or relieved while 44 were cured of all manifestations. In these cases, "the doses used were a minimum of 15 cc. for men, 12·5 cc. for women and correspondingly smaller doses for weak subjects and children, at intervals of three to seven days." The second series of 361 cases were selected for specific medication, either kharsivan or arseno-benzol being the agents available at the time. Only mild cases were treated. The maximum dose for an adult male was from 15 to 40 cc. Of these cases 32 had sanguineous diarrhoea as a reaction, 238 were relieved and 123 were cured. "Arsenious iodide with mercury solution was injected into 60 cases." The results were much better than with arsenious iodide alone. Seven patients developed inflammation of the gums and salivation. There was no sanguineous diarrhoea or other reactionary symptom.

The author's conclusions are as follows:—

"(*a*) About one in ten of cases require more than one injection of salvarsan. If such could be persuaded to remain in hospital they should be put under a course of Arsenious iodide and mercury solution, if necessary supplemented by another of salvarsan. If they leave hospital before all skin lesions are cured they should be asked to call again in one month's time.

"(*b*) The Government Agent should be requested to order the headmen of villages to send to hospital every case of parangi with any skin lesion, whether he has been previously injected with salvarsan or Arsenious iodide or not. It should be made criminal for any person to remain in a

crowded village with a parangi skin lesion, for he is a source of danger to others and of expense to Government in treating others who may be infected by him."

[It is to be regretted that the exact amount of drug administered is not given.]

A. Porter.

CLAPIER. **Notes sur le Pian observé dans la Région militaire de la Guinée.**—*Bull. Soc. Path. Exot.* 1917. Feb. Vol. 10. No. 2. pp. 90-94.

In French Guinea. yaws is stated by the writer to have a wide distribution in each of the three military divisions of the Colony. He regards the disease as being endemic or "endemo-epidemic." The house-fly is considered to be the principal agent of transmission—probably the sole agent and direct inoculation is effected through the conveyance of the virus from the yaws lesions to wounds and abrasions on the skin of the otherwise healthy.

A series of differential leucocyte counts is given which show that, whereas in yaws a relative increase in the large mononuclear cells is noted, in syphilis on the other hand the number of the lymphocytes is increased.

This paper should be consulted by those interested in the blood changes in this disease

R. P. Cockin.

HARPER (Philip). **The Late Sequelae of Framboesia.**—*Lancet.* 1916. Oct. 14. pp. 678-679.

Framboesia is endemic in Fiji, where the author is medical officer for the Ra province, but syphilis is unknown. A number of cases of tabes and general paralysis of the insane occurred in one district of 6,000 Fijians. It is difficult to examine Fijians for nervous disease, as trachoma or a similar malady often prevents the pupils of the eyes from being seen, while "the enormously thickened horny sole of a Fijian's foot renders the plantar reflex unobtainable." Three cases of tabes and three of general paralysis of the insane are described. Two of the cases of tabes showed double optic atrophy; the third was blind in one eye and the sight of the other was failing. In two cases, knee jerks were absent. In one, the "gait was a typical high-stepping motion with a broad base and a violent stamping down of the heel." In two of the cases, one pupil of the eye was large and the other small. In one case there was a reaction to accommodation but not to light, in the others no reaction to either light or accommodation.

All three cases of general paralysis of the insane showed increased knee jerks. Articulation was difficult and hesitating in two cases and tremor of the fingers occurred. Delusions were present in one patient, while another showed considerable muscular incoordination. Considerable changes in habit and temperament occurred in the cases of two brothers, one of whom was ultimately sent to the lunatic asylum at Suva.

The author concludes that "there is a very high rate of such nervous disease among the Fijians, but it must be remembered that the whole

Fijian population has been infected with yaws, and probably the case-rate following yaws might not greatly differ from the case-rate following syphilis."

A. P.

HARPER (P.). i. **Five Hundred and Forty-Two Cases of Yaws treated by Kharsivan and Arsenobillon.**—*Trans. Soc. Trop. Med. & Hyg.* 1917. Feb. Vol. 10. No. 4. pp. 82–87.

ii. **Treatment of Yaws.**—*Report to the Colonial Office.* Dated Oct. 16. 1916. 3 pp. 1917: Suva, Fiji.

iii. **Yaws as a Distinct Disease in Fiji.** [Correspondence.]—*Trans. Soc. Trop. Med. & Hyg.* 1917. Apr. Vol. 10. No. 6. pp. 114–116.

iv. LYNCH (G. W. A.). **Yaws and Syphilis** [Correspondence.]—*Ibid.* pp. 116–117.

The first two of these papers give the results obtained by the treatment of 542 cases of yaws with kharsivan and arsenobillon. The work was done at the Provincial Hospital at Ra, Fiji, and was carried out during a period of six months. In 455 cases of the series the injection of these drugs was given intravenously, in 87 intramuscularly. Ill-effects from the injections were noted in only two of the cases. In one of these phlebitis developed; in the other, thrombosis of the cephalic vein resulted, which necessitated operative interference. "In all the other cases there was a definite cure of all symptoms of active yaws."

Two cases of G. P. I. [which Harper regards in this circumstance as a para-framboesial manifestation] are noted as having benefited from the injections, one— a woman— considerably, and the other—a male—slightly.

Concerning substitutes for the "old German Salvarsan" the writer considers them as being equally efficient in the treatment of secondary and tertiary yaws, if administered in increased doses. They have also the advantage of being considerably less toxic. A table, summarising the chief manifestations of yaws met with in the cases of this series, is incorporated in both papers.

The third paper gives Harper's reasons for regarding the tabes and G. P. I. cases, referred to above, as para-framboesial manifestations. He states that "practically every Fijian suffers from typical primary and secondary yaws," and "from a train of symptoms, or from isolated symptoms, closely resembling various of the manifestations of tertiary syphilis." "Moreover, aneurism, general paralysis of the insane, and locomotor ataxy, are of frequent occurrence among the Fijians, one case perhaps occurring for every thousand of the total population."

The arguments which he cites "against the general prevalence of syphilis amongst the Fijians at the present time" are briefly as follows:—

"1. The absence of manifestations of hereditary syphilis, such as rashes, snuffles, deformities, marasmus, etc. . . .

"2. The absence of "Hutchinson's teeth" in Fijian children and adults."

3. The writer states that he has never seen a Hunterian chancre, genital or extra-genital, in a Fijian.

4. Europeans co-habiting with Fijian women do not contract syphilis.

5. The response of the Fijian disease to mercury is far less and to the higher arsenical compounds far greater than in the case of syphilis.

In the fourth paper, Lynch supports Harper's main arguments as to syphilis and the Fijian type of yaws being distinct diseases " which, in their secondary and tertiary manifestations, are strangely alike." He also adds that, in Fiji, gangosa is regarded as a late manifestation of yaws.

R. P. C.

LEGER (M.), MOUZELS (P.) & RYCKEWAERT (P.). **Le Pian à la Guyane Française.** - *Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 528–532.

An account of a case of yaws in which the history and lesions suggested Leishmania infection. The diagnosis was cleared up by the finding of *Spirochaeta pertenuis* in the serous exudate from one of the sores, and the absence of Leishman-Donovan bodies from both the exudate and scrapings from the edge of the sore.

The Wassermann reaction in this case was found to be negative.

R. P. C.

RELAPSING FEVER.

Macfie (J. W. S.) & **Yorke** (Warrington). **The Relapsing Fever Spirochaetes.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 81–85. With 1 graph.

Working with dried blood films and measuring in each film 25 spirochaetes "taken as they came," Macfie and Yorke arrived at the following conclusions from their measurements of 200 specimens of *S. duttoni*, 200 of *S. carteri* and 100 of *S. recurrentis* :—

"1. There is no appreciable difference in length between the spirochaetes causing European (*S. recurrentis*), Indian (*S. carteri*), and African (*S. duttoni*) relapsing fever.

"2. The spirochaetes, including double forms but not multiple individuals, range in length from 12μ to 36μ, but are most commonly about 17μ to 20μ long.

"3. We were unable to discover any morphological distinctions between the spirochaetes."

R. P. Cockin.

Koch (Jos.). **Zur Uebertragung des Erregers des europäischen Rückfallfiebers (Febris recurrens) durch die Kleiderlaus.** [Transmission of European Relapsing Fever by the Clothes Louse.]—*Deut. Med. Woch.* 1917. Aug. 23. Vol. 43. No. 34. pp. 1066–1069. With 6 figs.

Though the author does not claim that the body louse is the only infecting agent in European relapsing fever, he considers that it is the natural animal host of the disease and likens its functions, in this respect, to those of *Ornithodorus moubata* in relation to the relapsing fever of Africa. He bases his conclusions on experiments carried out during an outbreak of the disease at a Roumanian prison camp. The technique used by him in these experiments was as follows :– Lice removed from infected patients were crushed between two slides. A drop of Indian ink was added and the slides were examined. He states that Giemsa stain should not be used for this purpose as it is likely to stain the contents of the louse indiscriminately and make the search for spirochaetes difficult.

Spirochaetes were observed to be present in the lice from 16 of the 60 prisoners examined, *i.e.*, 26 per cent. Subsequently, a systematic examination of the whole number of the prisoners (270) resulted in the isolation of 70 persons who were suspected of being infected with the disease. The lice obtained from eight out of 20 of the suspects were found to be infected with spirochaetes.

Examination of the lice from 13 healthy prisoners resulted in spirochaetes being found in one louse. The author notes that lice obtained from febrile and non-febrile patients harboured the organisms with equal frequency and he questions whether the presence of numerous spirochaetes in the louse is due wholly to the sucking of human blood or whether multiplication and development of the parasites in the louse do not also play a part. This view, he considers, is supported by the very varied forms and arrangement of the spirochaete as observed in the louse. The number of spirochaetes found in his preparations varied from 2–5 to over 1,000 per preparation.

The author concludes his paper with a strong recommendation that all prisoners, suspected cases and, above all, infected patients should be freed from lice. He also recommends that action should be taken to exterminate the bed-bug; as, in his opinion, it may function as a transmitting agent of the disease.

Six plates are given which illustrate the various forms of spirochaete found in the louse.

R. P. C.

WERNER (H.) & WIESE (O.). **Die Uebertragung von Rekurrensspirochäten durch Kopfläuse.** [Transmission of Relapsing Fever by Head Lice.]—*Arch. f. Schffs- u. Trop.-Hyg.* 1917. Apr. Vol. 21. No. 8. p. 139.

An outbreak of relapsing fever amongst a civilian population in "the East" gave the authors of this paper an opportunity of ascertaining whether the head-louse (*Pediculus capitis*) was capable of functioning as a transmitting agent for the organism of this disease. In the course of their investigations, eleven head-lice, which had been fed upon normal, healthy individuals for five days previously, were permitted to feed upon recurrent fever patients at the height of the fever. Eight days later, two of these lice were found to be heavily infected with spirochaetes.

The spirochaetes were found in clumps in the body cavity, and smears made from the insects often showed as many as a hundred of these organisms in a single field of the microscope. The writers note that the percentage of infected lice which they obtained is approximately the same as was obtained by NICOLLE, BLAIZOT and CONSEIL during their researches on *Spirochaeta berbera.* The experiments in this latter case were, however, carried out with both clothes and head-lice.

R. P. C.

PETZETAKIS. **Le syndrome méningés au cours de la fièvre récurrente, ses rapports avec l'augmentation de la pression du liquide céphalo-rachidien; réaction méningée puriforme aseptique. L'efficacité du traitement par le 606; essai sur le traitement par l'électraragol et le mercure.**—*Bull. Acad. Med.* 1916. Oct. Vol. 76. Year 80. No. 40. pp. 253–255.

From observations on cases of recurrent fever at Athens, Petzetakis finds that meningeal symptoms are extremely common in the early days of the disease. Of 15 cases, four showed a typical picture of meningitis with rigidity of the neck muscles, Kernig's sign and intense headache. Three other patients had rigidity of the neck muscles only. The headache is due to the greatly increased pressure of the cerebrospinal fluid and is only relieved by lumbar puncture. As much as 50–80 cc. are quoted to have been withdrawn for this purpose.

The cerebro-spinal fluid contains neither spirochaetes nor cells and the amount of albumin present does not exceed the normal figure. Treatment by salvarsan, 0·6 gm., was promptly efficacious, and electrargol and oxycyanate of mercury also yielded good results. Electrargol was administered intravenously in 30 cc. doses and oxycyanate of mercury was similarly administered in 0·02 gm. doses on alternate days.

R. P. C.

PORTOCALIS (A.). **Un cas d'insuffisance surrénale aigue au cours de la fièvre récurrente; lésions préexistantes des capsules surrénales.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1917. Apr. 5. 3 Ser. Vol. 33. No. 11–12. pp. 545–550.

Notes on the case of a soldier, of the Salonica Garrison, who succumbed to an attack of relapsing fever complicated by extensive caseous degeneration of the suprarenal capsules of both sides.

The symptoms simulated those of cholera, which was excluded by bacteriological examination. A complete diagnosis was not possible until the autopsy was made.

R. P. C.

PLOTZ (Harry). **Cultivation of *Spirochaeta obermeieri*.**—*Jl. Experim. Med.* 1917. July. Vol. 26. No. 1. pp. 37–39. With 1 plate.

In this communication Plotz reports the successful cultivation of *S. obermeieri* directly from the blood of patients suffering from European relapsing fever. The work was carried out in Serbia in the winter of 1915; five successful cultures were made from clinically typical cases of the disease occurring in civilians and soldiers.

The method of cultivation was that suggested by NOGUCHI [see this *Bulletin*, Vol. 1, p. 40], and all the cultures were made during the febrile stage of the disease. The maximum growth appeared on the fifth day, after which growth gradually decreased. Plotz states that preparations made from the junction of the ascitic fluid and blood displayed a greater number of organisms than preparations made from the upper part of the medium. The most striking feature in the young cultures is the spirochaetal node, "which appears in practically every organism." From one to four of these nodes may be observed. In older cultures they are less frequently noted. The writer states that he believes these nodes to be the points at which longitudinal division subsequently occurs.

Subinoculations are made, about the fifth day, by withdrawing 0·5 cc. of ascitic fluid from the lower part of the medium, *without blood.* To each of the transplants 2 cc. of defibrinated human blood is added, as the presence of haemoglobin aids the subsequent growth. Plotz has succeeded in cultivating this organism for five generations in two cultures by this technique.

A plate giving three microphotographs illustrates this article.

R. P. C.

POROT (A.). **Délire et réactions psychomotrices dans la fièvre récurrente de l'indigène.**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 532–536.

Porot calls attention in this paper to the frequency with which recurrent fever in natives of Algeria is associated with an abrupt, violent delirium. He advises that, in an area in which relapsing fever is endemic, delirium in a native, when associated with fever, should invariably lead to a search for spirochaetes in the blood. The notes on four cases illustrate the paper.

R. P. C.

DE RUDDERE. **La fièvre récurrente spirillaire et son traitement aux troupes de l'Est Africain Allemand.**—*Arch. Med. Belges.* 1917. Aug. Vol. 70. No. 8. pp. 710–713.

Relapsing fever is stated by the author to be widespread in German East Africa and the Belgian columns operating there have suffered considerably. In consequence of the almost invariable presence of the transmitting agent, *Ornithodorus moubata*, in the native villages and abandoned camps along the caravan routes, stringent orders were issued forbidding the troops or carriers to rest in these places or to remove bedding material from them. It was found that ticks were carried for long distances in blankets and several of the native troops admitted to hospital with relapsing fever were found to harbour *Ornithodorus moubata* in their packs.

In the opinion of the writer, salvarsan is only of service in the treatment of relapsing fever when administered during the initial attack. Subsequently, its administration neither shortens the duration of the relapses, diminishes their severity nor lessens their number. In consequence of the great number of relapsing fever cases and the need of finding a less costly and more easily administered drug, the writer's choice fell on satoxyl of which the composition is as follows :—

Atoxyl	gm.	10
Sublimate . .	gm.	0·3
Pot. Iod. .. .	gm.	2·5
Dist. Water	gm.	100

Of this, 3–4 cc. were administered, twice weekly, by intramuscular injection. This treatment was followed by marked improvement in the temperature and relief in the case of both the headache and photophobia. Occasionally the injections do not prevent later relapses; but, in these, all the painful symptoms are mitigated.

Of relapsing fever, in German East Africa, the author states that complications are not rare and that irido-cyclitis is common, even subsequent to the occurrence of the fever and in the absence of spirochaetes in the peripheral blood. Unilateral facial paralysis is a frequent complication but is of no serious import. It may last for months but ultimately disappears completely. Serious epistaxis is occasionally met with and may prove fatal in debilitated patients. In the more serious cases, changes in the cardiac muscle occur. For these the author recommends digitalis and strophanthus with absolute rest. Syncope occasionally occurs and may prove fatal.

R. P. C.

TOYODA (S.). **[Study of the Organism of Relapsing Fever in Manchuria.]**—*Saikingaku Zasshi* (*Jl. Bacteriology*). 1916. Sept. 10. No. 250. pp. 47–77. [From Review by R. G. MILLS.]

The spirochaete producing this disease in Manchuria (and Korea) is regarded as a different organism from that which causes the disease elsewhere.

The pathogenicity of this strain for the monkey was previously recognized. The author has succeeded in infecting the mouse, rat and guinea-pig with four different cultures. The African type is strongly pathogenic for these animals and the European one to a certain extent. This one seems to be the least pathogenic of all in its effects upon animals.

An animal once recovered from an infection with the Manchurian spirochaete is not susceptible to reinfection with the homologous strain. This is not the case with other Manchurian strains or those from the other forms of the disease in America, Europe or Africa. Several experiments are recorded involving the use of various strains and animals immunized to them.

1. Two mice recovered from an infection by the Manchurian strain, injected daily, for 14 days, with a culture that had been passed through animals 14 times .. .. no infection.
   Controls with normal mice .. .. infected.
2. Similar immune mice, injected with African strain also passed through 14 animals and inoculated 14 times .. infected.
   Controls with normal mice .. .. infected.
3. Three mice recovered from the African infection, injected with the Manchurian strain, passed through animals .. infected.
   Controls with normal mice .. .. infected.
4. Mice immune to the African strain, injected again with the same culture passed through animals .. no infection.
   Controls with normal mice .. .. infected.
5. Three rats immune to African strain injected daily with the European strain, passed 12 times through animals
   no infection.
   Controls with normal rats .. .. infected.
6. Three rats immune to the European type, injected with 12 passages of African strain .. 2 negative, one positive on the 9th inoculation.
   Control with normal rats, positive after the 6th, died after the 9th. The author considers that animal inoculation has brought the European and African strains very close together immunologically.
7. Mice recovered from African strain infection, injected with cultures taken daily from patient sick with Manchurian type of the disease .. .. infected.
   Control with normal mice .. .. infected.
8. Same kind of mice injected with same strain but having been passed 30 times through animals .. .. no infection.
   Control with normal mice .. .. infected.
9. Mice recovered from infection by Manchurian strain that had been passed 30 times through animals, inoculated again with same strain .. .. infected.
   Control with normal mice .. .. infected.

The Manchurian strain having acted so specificially in the above experiments, the question arose as to the uniformity of these reactions. Cultures were obtained from two Chinamen named Wang and Tam, and inoculations made into monkeys, and mice. The monkeys were immune to their homologous strains but susceptible to the heterologous ones. Both strains were pathogenic for normal monkeys after the usual interval of three days. They were also non-immune to the African and European strains.

The serum of a man recently recovered from Manchurian relapsing fever was used to test its prophylactic value on two men inoculated with Tam's and Wang's strains. It proved to be of value in the former case only. It had no effect on a patient inoculated with the African spirochaete. Other sera taken from cases recovered from the fever were of little use in a curative way when used on patients in whom the disease had developed.

The appearance of the organisms when producing disease in animals is quite different from the typical form seen in human blood. They are shorter and smaller than the normal, which is given as 7–20 microns long by 0·4 wide, and the turns of the spiral number from 4–8. The form was not a typical spiral but the individual turns were frequently of different sizes, and the whole was often in the shape of a ring irregularly twisted. These involution forms were produced by all the strains of the Manchurian spirochaete as well as by those from abroad and all seemed to approach a common type in which individual characteristics were lost. No logical conclusion seemed possible as to the specificity of the various strains from different parts of the world.

In the clinical description of the cases attention should be drawn to the frequency of liver enlargement, albuminuria and the diazo reaction. The mortality rate was 5.3 per cent. in 75 cases. The records showed that 15 patients had one paroxysm, 33 had two, 4 had three, and one had 4.

The lengths of the paroxysms and the afebrile intervals were :—

1st paroxysm	5–13 days.
Interval	2–14 „
2nd paroxysm	1–9 „
Interval	2–13 „
3rd paroxysm	1–6 „
Interval	2–10 „
4th paroxysm	2–6 „

Lice were recognized as the transmitting agent but no additional proof was adduced.

Infection in animals was much easier after a previous passage through one or more monkeys. Mice were the most easily inoculated, then young rats and finally guinea-pigs. In the last the organisms appeared in the blood in 1–2 days after inoculation. The spirochaetes were passed through 120 mice with no relapses and no death. Attempts to inoculate the rabbit were unsuccessful.

R. P. C.

MACFIE (J. W. S.) & CARTER (H. F.). **The Occurrence of *Spirochaeta eurygyrata* in Europeans in England with a Note on a Second Species of Spirochaeta from the Human Intestine.**—*Ann. Trop. Med. & Parasit.* 1917. June 30. Vol. 11. No. 1. pp. 75–79. With 2 figs.

Macfie recently recorded that *S. eurygyrata* was " well-nigh an invariable inhabitant of the human intestine at Accra on the Gold Coast," and Carter found the same organism present in the stools of 56·5 per cent. of the dysenteric patients from Gallipoli and Egypt which he examined. They now report its presence in 56·2 per cent. of Europeans at Liverpool.

" Altogether 105 persons were examined, namely, 82 hospital patients (59 men and 23 women) and 23 normal men." The hospital patients were suffering from surgical conditions and were free from intestinal disorders. " None of the patients, so far as could be ascertained, had ever resided in the tropics." In the majority of cases the infections were not large, but the writers state that " from the examination of this small sample of an average European population it would appear that *S. eurygyrata* is a frequent inmate of the human intestine in temperate climates, and may be found in over 50 per cent. of individuals." The results of their examinations are given in the subjoined table:—

	Number examined.	Number harbouring *S. eurygyrata.*	Percentage.
Hospital patients	82	49	59·8
Normal men	23	10	43·8
Totals	105	59	56·2

During the course of the above investigations a second type of spirochaete was noted on one occasion. The organism is much larger than *S. eurygyrata* and measures 16·2μ in length and 0·3–0.4μ in thickness. The ends taper slightly and are "rather blunt." "One or two of the organisms showed an appearance that might have been due to the presence of an undulating membrane." These organisms were not observed alive and are described from a dried film.

The authors propose the name *Spirochaeta intestinalis* for this organism, should it prove to be a new species.

R. P. C.

NOGUCHI (Hideyo) & AKATSU (Seinai). **Immunological Studies on Pure Cultures of Various Spirochaetes.**—*Jl. Experim. Med.* 1917. June. Vol. 25. No. 6. pp. 765–788.

This paper gives an account of immunization experiments in which rabbits, of about three kilogrammes weight, were employed and in which immunization was attempted by the intravenous injection, weekly, of 1·5–3 cc. of the fluid cultures of the various organisms studied. Strains of *Treponema pallidum, T. calligyrum, T. microdentium, T. mucosum* and *S. refringens* were used and the medium used for cultivation consisted of equal parts of normal rabbit serum and faintly alkaline bouillon with a piece of fresh rabbit kidney added. The age of the cultures employed varied from 14–30 days and the number of spirochaetes was approximately 30–40 per field, when examined by dark field illumination (Leitz oc. 3, $\frac{1}{12}$ in oil immersion).

It was found in the sera derived from rabbits immunized with the various spirochaetes that agglutinins for the homologous antigens were present in varying quantities. The immune sera in the *pallidum* group were richer in agglutinins than were the sera in the other groups, but there was no parallelism between the amount of antigen injected and the amount of agglutinin developed. The reactions between the immune sera and antigens belonging to different species were relatively specific. There were, however, certain affinities between the various spirochaetes as demonstrated by the agglutination reaction of the various immune sera. "It appears that the *pallidum* is more or less related to the *calligyrum*, while the affinity between *calligyrum* and *refringens* and possibly also between the *calligyrum* and *mucosum* in a much smaller degree, seems close."

After cessation of immunization, the agglutinin contents rapidly disappear and in three months have fallen to 0·01 of the original strength. The rate of disappearance is irregular in different animals and bears no direct relationship to the original titres. The immune sera were found to possess complement fixation powers in varying amount. The anti-*pallidum* sera possessed higher average titres than the other sera tested with their corresponding homologous antigens.

Spirochaeticidal properties were also present in the immune sera in varying amounts and many of the anti-*pallidum* sera killed their own strains. The paper contains many tables and much technical information which should be referred to by those interested.

R. P. C.

NICOLLE (Charles) & BLANC (G.). **Première enquête sur l'existence, chez le rat de Tunis, des spirochètes pathogènes pour le cobaye.**—*C. R. Soc. Biol.* 1917 May 5. Vol. 80. No. 9. pp. 445–446.

Between February 9th and March 6th, 1917, these writers examined 119 specimens of *Mus decumanus* with a view to determining whether these rodents harboured the spirochaete of spirochaetosis icterohaemorrhagica or the organism of rat-bite fever.

Of these, 91 were examined for spirochaetes and 28 for the organism of rat-bite fever. The guinea-pig was the experimental animal used throughout this research and ultra-microscopic examinations were done in each case Except for three guinea-pigs which succumbed to secondary infections there was no mortality and the results were invariably negative.

The writers state that the rats were obtained from the streets of the town never from the sewers or the vicinity of the port, and do not conclude that these infections are absent because of their negative experiments They consider that seasonal incidence may explain their results

R. P. C.

NAKANO (H.). [**Spirochaetes of Rats and Mice.**]—*Hifukwa Hitsunyokwa Zasshi.* (*Japan. Zeitschr. f. Derm. u. Urol.*). 1917. Feb. Vol. 17. No. 2. pp. 1–8. [From Review by R. G. MILLS.]

This article contains a fairly complete account of the subject from CARTER's observations in 1887. An account is given of the organisms found by MACNEAL and MESINESCU, BORREL, BREINL and KINGHORN, WENYON, GAYLORD, CALKINS, and DEETJEN.

Concerning the spirochaetes of the rat and particularly those claimed to be the cause of rat-bite fever, several articles have appeared from Japanese authors, notably FUTAKI and ISHIHARA. However all authors do not agree as to the causal factor in this disease. OGATA has described a hyphomycete as the cause, and SCHOTTMULLER, TILESTON, BLAKE, Ruth TUNNICLIFF, LITTERER and Francis G. BLACK have incriminated a streptothrix. During the past year the author has found spirochaetes in the wounds, regional lymph glands, blood and erythematous eruption of two cases by means of dark field illumination, Levaditi's method and culture, but is not able to reach a definite conclusion as to which is the true cause.

Similarly a description is given of the intestinal spirochaetes found in man, from ESCHERICH (1884) onwards.

The author finds no record in literature indicating that the spirochaetes of the intestine of the rat have been investigated, although recently their presence in the kidneys, liver, spleen and blood has been repeatedly noted in Japan.

The present contribution deals with those spirochaetes found in the intestines of the house rat (*Mus decumanus*), white rat and mouse. For examination with the dark field illuminator a ringed cover glass is placed on a slide over a drop of 0·1 per cent. bichloride of mercury or 0·5 per cent. carbolic acid solution mixed with a loopful of the suspected material. This solution stops all motion and facilitates examination of the spirochaetes. As a result of these methods the following facts are recorded :—

1. In the house rat there are two kinds of spirochaetes, one whose morphology conforms to that of *Sp. dentium*, the other a larger form, 15–20 microns long, and 0·5–0·8 microns wide, actively motile and having 2–4 large coils. He examined 58 rats of which 50 had the larger type in their intestines and 41 the smaller. In all but one of the latter series the larger form was found also.
2. In white rats the same two forms were found ; 20 harboured the large form, 10 the smaller, and six had both together.
3. In the intestines of 73 mice examined there were found three varieties, the large and small ones mentioned above being present and also a medium-sized one, 9–12 microns long by 0·5–0·8 microns wide, with 3–6 turns, the movements differing somewhat from that of *Sp. dentium* and reminding one of those of a leech. These had a flagellum at each end. Of the 10 infected with the large form nine had this kind only ; the remaining one had all three varieties. Of the five with the medium sized variety four had also the smaller one Spirochaetes of one kind or another were discovered in 64 out of the 73 animals examined.

R. P. C.

Ishiara (K.), **Otawara** (T.) & **Tamura** (K.). **[Spirochaetes in Rats.]**—*Hifukwa Hitzunyokwa Zasshi.* (*Japan. Zeitschr. f. Derm. u. Urol.*). 1917. Feb. Vol. 17. No. 2. p. 87. [From Review by R. G. Mills.]

During the investigation of the possible cause of rat-bite fever the authors examined 186 rats [during 1915–16]. Of this number 11·2 per cent. harboured spirochaetes. Of 155 blood examinations four were positive and of 140 tested by animal inoculation 14 gave positive results. In 73 cases of rat-bite six were positive.

R. P. C.

Haga (I.), **Yoshigawa** (T.), **Umemoto** (E.) & **Hiroshige** (T.). **[Spirochaete Disease prevalent among Marmots.]**—*Tokyo Igakukai Zasshi.* (*Mitteil. d. Gesellsch. z. Tokio.*) 1916. Dec. 20. Vol. 30. No. 24. pp. 55–56. [From Review by R. G. Mills.]

Blood or infected organ extract introduced into the body of a healthy animal initiated symptoms in from 3–7 days. The febrile paroxysms usually lasted 7–10 days and just before they began there was a preliminary depression of temperature for about an hour. The rise and fall of the temperature was coincident with an increase and decrease in the number of the spirochaetes. Rabbits were only slightly affected by similar injections and speedily recovered. Rats and guinea-pigs were both susceptible but in a less severe form.

In the case of marmots, the living together of sick and healthy animals was sufficient to produce the disease. The bite of a sick animal would transmit the disease as also injection of the saliva. The long haired variety was noticeably more susceptible. It was found that a louse from one of these, mashed up and injected subcutaneously, would produce the disease. The urine and faeces were also capable of transmitting the infection.

R. P. C.

Ito (T.), Matsusaki (S.), Amaya (K.), Shinosaki (K.), Yamamoto (S.) & Imai (I.). [*Spirochaeta icterohemorrhagiae*, **Improved Culture Media, Prophylactic Vaccine and Serum Treatment.**]—*Tokyo Igakukai Zasshi.* (*Mitteil. d. Gesellsch. z. Tokio*). 1916. Nov. 5. Vol. 30. No. 21. pp. 57–59. [From Review by R. G. Mills.]

A transparent medium is prepared of one part horse serum and four parts agar solution containing 15–30 per cent. gelatine. This is incubated for 24 hours to insure sterility. It is covered with sterile liquid paraffin to a depth of 1–2 cm. after inoculation. Within a week, the organisms grow to a visible degree in the upper layers. Full development takes place in 3–4 weeks. The growth appears like a cloud and the characteristics on the media are not materially different from those already reported.

A vaccine has been prepared by the fractional sterilization of the culture in a flask at 56° C. and ½ per cent. carbolic acid added. In the absence of a method of standardization, the fluid must be tested on animals to determine its degree of toxicity and the human dose estimated accordingly. It has been used in man on several occasions without any particular reaction developing.

This vaccine injected into a horse produces a serum which has been used with some apparent success on animals suffering from experimental infections. It is considered that it may be of value in human infections if used in the early stages.

R. P. C.

Reiter (Hans). **Ueber die** *Spirochaete forans.*—*Cent. f. Bakt.* 1 Abt. Orig. 1917. Mar. 31. Vol. 79. No. 4. pp. 176–180. With 1 plate.

During the investigation of a disease in which pains in the joints, enlargement of the spleen, conjunctivitis, cystitis, iritis and fever of a week's duration were the main features, Reiter cultivated from the venous blood a spirochaete which he names *Spirochaeta forans.*

The spirochaete grows readily in ascitic fluid-bouillon media and stains easily with alcholic fuchsin, methylene blue and Giemsa. The older cultures stain more readily than the younger cultures. The number of coils varies with the period of growth and the youngest forms have the appearance of vibrios.

Morphologically the fully grown *S. forans* is similar in appearance to *S. pallida* but it is distinctly stouter and responds more readily to stains. A full account of the cultural characteristics is given and a plate, which fails to illustrate the details referred to in the text. No measurements are recorded.

R. P. C.

PLAGUE.

Philip (W. M.) & Hirst (L. F.). A Report on the Outbreak of the Plague in Colombo 1914–1915.—*Jl. of Hygiene.* 1917. Feb. Vol. 15. No. 4. pp. 527–564. With 5 maps & 1 chart.

A period of eighteen years elapsed before plague, which had broken out in India in 1896, reached the island of Ceylon, its advent in that island being announced by Castellani and Philip in 1914. The Government of Ceylon was, however, during this period fully alive to the probability of infection and regulations were in force with regard to inspection and quarantine of immigrants from infected areas. Rodent destruction had been systematically carried out in Colombo; in February 1912 the municipality of that town first employed a bacteriologist, and a systematical bacteriological examination of rodents was made.

The disease was apparently introduced into Ceylon by infected rodents from Negapatam on the mainland. The first human case bacteriologically diagnosed as plague occurred in South Street, a crowded insanitary quarter lying adjacent to the harbour, on the 25th January 1914, but suspicious cases of "sudden death" had cropped up previously in this locality. Within the next two weeks 19 cases of sudden death occurred, 18 of which proved to be due to septicaemic plague. The total deaths from plague among the human population of Columbo were 383 in 1914 and 128 in 1915, a comparatively small mortality, but the following features of the epidemic were, however, sufficiently remarkable and unusual to render them worthy of careful study. (*a*) The percentage incidence, both among human beings and rats, was low except among the rats at the commencement of the epizootic, yet the virulence of the infection was very great. (*b*) The clinical signs in the human subject were often very obscure. (*c*) There was frequently a remarkable absence of distinctive post-mortem signs, not only in the human subject but in both naturally and artificially infected rodents. The septicaemic type of infection prevailed over the bubonic among naturally infected *Epimys* [*Mus*] *rufescens*, the Columbo house rat, as it did in the human subject. (*e*) The usual method of estimating the incidence of plague among rats by a study of their post-mortem appearances, which had proved so successful in Northern India, would for this epizootic fail to detect a large proportion of the most heavily infected rats. (*f*) The usual signs of an epizootic among rats was conspicuous by their absence both before and since the appearance of plague. (*g*) The predominant rat flea was a different species from that occurring on rats in most plague infected localities. (*h*) Plague as it appeared in Colombo was a disease which might easily escape detection for long periods in localities where an efficient system of inquiry into the cause of deaths is not in operation. (*i*) There was experimental evidence that the Ceylon strain of plague is peculiar in some respects. (*j*) The incidence of human plague was almost entirely confined to certain insanitary districts of the city.

The following table shows the case mortality and nature of infection during the epidemic period. It will be seen that the case mortality among the bubonic cases was very high, the disease running an exceptionally rapid course; the septicaemic cases were invariably fatal:—

	1914.	1915.
Total cases	412	138
Total deaths	381	128
Septicaemic cases	246	80
Septicaemic deaths	246	80
Bubonic cases	166	58
Bubonic deaths	135	48

In two of the negative human cases, a bipolar-staining Gram-negative bacillus resembling *B. pestis* was found, pure cultures producing in experimental animals post-mortem appearances somewhat suggestive of plague. The organism in question was, however, probably *B. lactis aerogenes.*

During the two years of the epizootic a large number of rodents were examined for plague infection at the laboratory. The rats examined were of two species—*Epimys rufescens* ("the local representative of *Mus rattus*") and *Epimys norvegicus* ("the *Mus norvegicus* of many writers on plague.") The results obtained are indicated as under:—

	Epimys rufescens.		*Epimys norvegicus.*	
	1914.	1915.	1914.	1915.
Total number of rodents examined for plague	11,183	13,757	3,891	5,129
Total number of rodents infected with plague	127	33	106	30
Gross percentage incidence ..	1·13%	0·23%	2·72%	0·58%
Number of rodents trapped alive	10,996	13,623	3,773	5,009
Number infected with plague	103	27	90	24
Percentage incidence	0·93%	0·19%	2·38%	0·47%
Number of rodents found dead examined for plague ..	187	134	118	120
Number of rodents found dead infected with plague ..	24	6	16	6
Percentage incidence	12·83%	4·47%	13·56%	5%

The percentage of septicaemic cases among *rufescens* was very in comparison with *norvegicus*, being 45·08 and 60·6 respectively for the two years, against 20·75 and 30 respectively. Four infected *Mus musculus* and five infected *Bandicota malabarica* were also found during the period under review. The percentage infection in 1914 was highest for *rufescens* in March (7.51 p.c.) and for *norvegicus* in February (8·11 p.c.), while in 1915 the height of the infection for both species was reached in the month of March (0·65 p.c. and 0·80 p.c. respectively). With regard to diagnosis, in fresh carcasses reliance was chiefly placed on the microscopic method, frequently controlled by the isolation of the organisms in culture from organs or from the tissues of guinea-pigs inoculated with organ emulsions, or by Ascoli's thermo-precipitin test; in decomposed carcasses the microscopic method was invariably supplemented by cutaneous inoculation of guinea-pigs and by the precipitin test. With regard to macroscopic appearances the most reliable single sign of plague infection was found to be granular necrosis

PHILIP (W. M.) & HIRST (L. F.). *Jl. of Hygiene.*] [*Trop. Dis. Bull.* **Vol. 10. No. 5.**

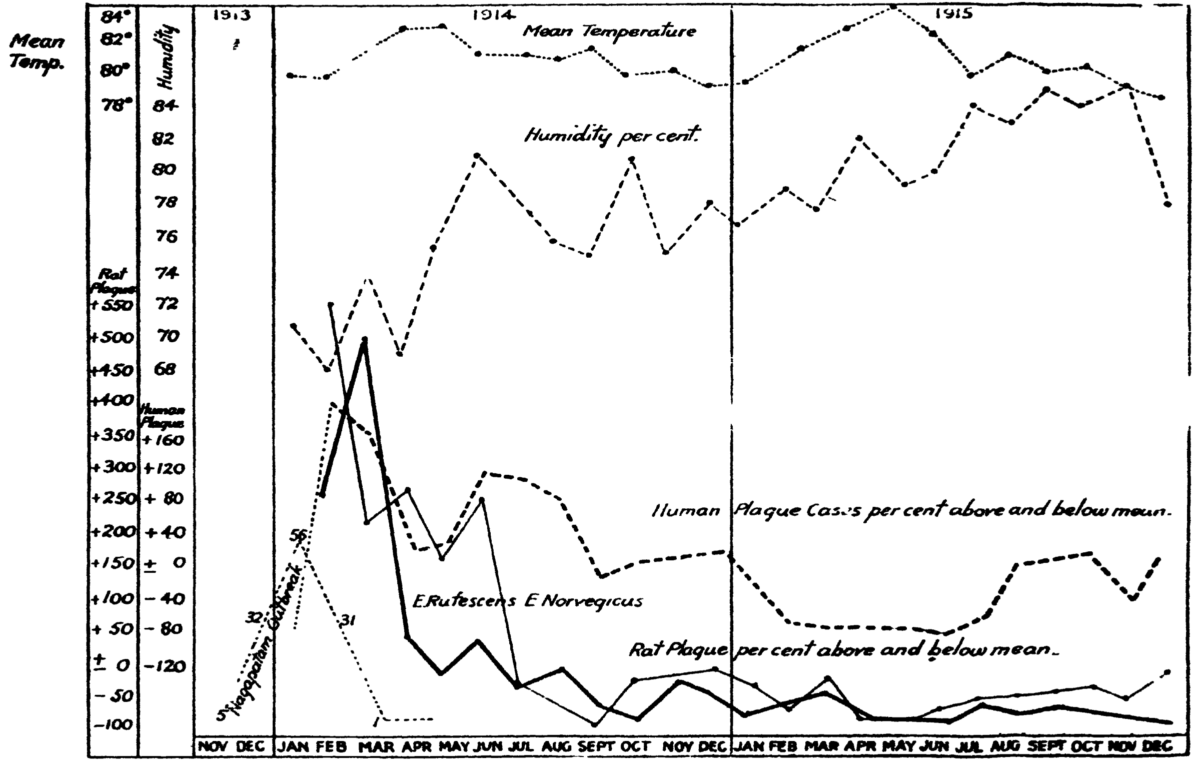


Chart showing seasonal incidence of Plague in Man and Rats.

[Reproduced by permission from the *Journal of Hygiene.*

of the liver; clear pleural effusion was also regarded as being very suggestive. Only twelve rats, however, during 1914 showed really typical post-mortem appearances.

The following species of ecto-parasites were identified from Colombo rats.

Siphonaptera	*Xenopsylla astia* Rothschild.
	„ *cheopis* Rothschild.
Gamasidae ..	*Dermannyssus muris* Hirst.
	Laelaps echidninus Berlese.
	„ *nuttalli* Hirst.
Louse ..	*Haematopinus spinulosus.*

All the fleas examined in 1912 proved to be *Xenopsylla astia* but of 200 fleas collected in March 1914 sixteen proved to be *Xenopsylla cheopis.*

"Observations made in 1913 before the outbreak of plague showed that *X. astia* bites man with great reluctance at temperatures over 80° F. We have experienced the greatest difficulty in transmitting plague from rat to rat under experimental conditions through the agency of *X. astia*. . . .

"Everything appears to point to the conclusion that the conditions prevailing in Colombo are exceptionally unfavourable to the transmission of plague infection, since in spite of the virulence of the infecting organisms and the susceptibility of the human and rat population, the incidence of the disease is low for both except at the very commencement of the epidemic.

"It is not yet possible to decide whether this is mainly due to the effect of climatic condition on the vitality of the flea, to the relative inefficiency of *X. astia* as a porter of plague, or to any other cause.

"In view of the exceptionally high degree of septicaemia in many of our cases of human plague, the question of the possibility of the transmission of the infection from man to man through the agency of human ecto-parasites such as *Pulex hominis, Cimex rotundatus* or *Pediculus corporis* becomes of practical importance and especially in view of the work of Nicolle and his collaborators. We are not yet, however, in a position to record any fresh data bearing on this matter."

R. St. J. Brooks.

GLOSTER (T. H.), WHITE (F. N.), MUKHARJI (A. N.), CHAUDHURI (J. S. Roy). MITRA (C. C.), MANDAL (G. C.) & RAM (Manji). **Epidemiological Observations in the United Provinces of Agra and Oudh, 1911–1912.**—*Jl. of Hygiene.* Plague Suppl. 5. 1917. May 9. pp. 793–880. With 4 maps & 9 charts.

The attention of the Government of the United Provinces of Agra and Oudh having been directed to certain abnormalities in the distribution and incidence of plague, Sir John HEWITT, the then Lieutenant-Governor of the Provinces, invited the Plague Research Commission to investigate the facts.

Four problems in particular presented themselves for examination and were made the subject of special study by the Commission. They may be conveniently expressed in the form of the following questions: (1) Why does Lucknow suffer less severely and less persistently from plague than Cawnpore, which is comparatively adjacent to it? (2) Can any explanation be offered as to why Ballia is the most persistently and severely infected district in the United Provinces? (3) Why do the districts of the Bundelkhand, viz., Jhansi, Jalaun, Banda and Hamirpur, suffer less severely from plague than the districts of the Gangetic plain? (4) Can any explanation be offered for the unusually severe epidemic which occurred in Muzaffarnagar in 1906–7 and in Muttra in 1904–5?

Laboratories were established in Lucknow and Cawnpore for the purpose of eliciting facts regarding the rats and fleas in these places and the collection of data which might have a bearing on the epidemics which had occurred in the Provinces as a whole. At a later date laboratories were also opened in the Ballia district and at Banda in the Bundelkhand. The rat investigation was commenced in Lucknow in January 1911 and during the year, 38,710 " rats " of all kinds were examined in the laboratory. Of this number 1,071 were mice (2·7 per cent.) 819 were musk rats (2·1 per cent.), the remainder, 95·2 per cent. were *Mus rattus.* 262,489 fleas were found on 35,388 *Mus rattus* examined, giving an average of 7·4 fleas per rat. Of these fleas 2,683 were *Ceratophyllus fasciatus*, the remainder being nearly all *Xenopsylla cheopis.* In Cawnpore, during the year under review 52,368 rats were caught. Of these 51,365 were *Mus rattus.* Fleas were counted on some 50,000 rats during the year, the total number of fleas observed being 472,657, giving an average of about 9 fleas per rat for the whole year. Almost all the fleas were *Xenopsylla cheopis*, but 1,112 were *Ceratophyllus fasciatus*, about 0·2 per cent. of the whole. With regard to the question as to why Cawnpore has suffered more severely and persistently from plague than Lucknow, the Commission summarise the results of their enquiries as follows :—

" (*a*) Cawnpore is a much larger and more important trade centre than Lucknow, and having more intimate trade relations with many infected places in India it is exposed to greater risk of infection

" (*b*) Cawnpore is a more rat infested city than Lucknow so that when plague infection has been brought to the town the chance of the disease becoming permanently established is greater.

" (*c*) Its extensive trade in grain, the construction of its houses, its dense population, its narrow streets, and the custom of its inhabitants, living as they do in close proximity to their grain stores and their domestic animals, bring a large section of the people into close association with rats which convey plague infection to them by means of infected fleas.

" (*d*) The number of fleas found on the rats in Cawnpore is larger than in Lucknow and attains a maximum at an earlier period in the plague season, thus favouring the establishment of infection at an earlier date."

With regard to the incidence of plague in the Ballia district, it had been observed that the disease was characterised by persistence from year to year rather than by the outstanding severity of any particular epidemic. Plague reached its point of greatest severity in the district in 1909–10 when 33,402 deaths occurred, representing a mortality of 36 per thousand of the estimated population. The mortality had never been less than 2·6 per thousand, even during periods when the United Provinces as a whole had enjoyed comparative immunity from infection. Closely related to the severity of plague in Ballia was the persistence of the disease during the non-epidemic period. After prolonged investigation of the facts and after examination and analysis of the rat and flea population for a period of over sixteen months, the Commission found itself unable to furnish a completely satisfactory explanation of the problems which had confronted it. They however came to the conclusion that the persistence of plague during the non-epidemic period might be correlated with " (1) The observed high prevalence of fleas in June, July and August. . . . (2) Our meteorological observations, which show that in May, June and July 1911, the relative humidity in Ballia was higher than that recorded at any other station in the United Provinces, while Rurki and Gorakhpur alone recorded lower monthly mean temperatures during this period."

With regard to the relative immunity from plague enjoyed by the Bundelkhand districts, the Commission point out that the freedom from or susceptibility to plague of a district or country depends upon a combination in varying degrees, of climatic conditions, number and habits of the inhabitants, number or immunity of rats to plague, flea prevalence and so forth. The Jhansi district of the Bundelkhand, for example, is drier and hotter than any other part of the United Provinces, especially during the winter months. Plague only becomes epidemic in Jhansi at this season in years of exceptional humidity. In the hot weather the climate is intensely hot and dry so that epidemics at that season rapidly decline and terminate, very few deaths from plague being reported in July and August, the commencement of the favourable season. The comparatively low density of the population may have some influence on the course of the disease in the Bundelkhand, but the isolation of the population from the great industrial centres (often hot-beds of plague) is probably of far greater importance.

"Again in the Bundelkhand the people live on the grain grown on the land and import little agricultural produce; trade, therefore, which often carries infection in its wake, is poor in the Bundelkhand.

"Observations made in Jhansi and Banda on rats and fleas showed that rats were present in abundance throughout the districts and that the flea infestation of the Banda rats was higher than in any other district in the United Provinces. The Banda rats, moreover, were found to be very susceptible to plague, when compared with rats from Lucknow or Cawnpore. Nevertheless, the presence of a comparatively large number of very susceptible rats infested with many fleas found in the Bundelkhand is of little moment in favouring plague, for infection seldom reaches them. Severe epidemics may occur, and have occurred, when infection has been successfully imported (*e.g.*, the epidemic in Jhansi in 1911), but infection must be implanted early in the season to produce a severe epidemic, for the favourable period for plague is comparatively short."

In Muttra and in Muzaffarnagar the severe epidemics which occurred in 1904–5 and 1906–7 respectively were associated with unusual humidity during the winter and spring months, the same correlation being observed in other districts of the United Provinces investigation by the Commission at this time. The paper concludes with the following remarks, in this connexion.

"The association of unusual humidity during the winter months in certain districts with severe epidemics of plague is so constant a phenomenon that we feel justified in concluding that one stands to the other as cause to effect. We have further good grounds for believing that this cause exercises its effect mainly through its influence on the length of the life of rat fleas when separated from their host, for the longer a rat flea is able to survive in such circumstances the greater are its opportunities, in an infected area, for conveying the plague bacillus either to rats or to human beings."

R. St. J. B.

MALTA. Report on the Subject of Laboratory Investigation into Cases of Plague in the Island. [ZAMMIT (Tem.), Government Analyst, & ALCOCK (W. Broughton), Major R.A.M.C.].—MS. Report.

This report relates to the work carried out in the Public Health Laboratory, Malta, in connection with the outbreak of plague which occurred in the Island during the spring of the present year. The number of human cases is not stated, but reference is made to the report on the epidemiological observations on the outbreak by Dr. **BERNARD**, Medical Officer of Health. Five human cases came directly under the notice of the authors. One of these terminated fatally but there were no features of special interest.

Rat examinations were carried out at the Laboratory and were still proceeding at the time of the writing of the report. From April 2nd to July 1st about 1,000 rats were examined, 15 of which were found to be infected with *B. pestis*. All but about 139, received from Valetta or the surrounding district, were obtained from the Naval Dockyard Stores, shops, docks and other comprised localities. "Considering that the disease among the rats extended over a wide area in the dockyard, also that the number of men exposed to infection was very great a further number of cases amongst men might have been expected, but the present freedom of man from infection may be compared with similar observations made when initial outbreaks of plague have occurred in other countries."

With regard to flea infestation, *Xenopsylla cheopis, Ctenopsylla musculi,* rarely *Ceratophyllus fasciatus* and more rarely *Ctenocephalus* were found on the rats but never on man. *Pulex irritans* was found exclusively on man.

The fleas examined were tabulated thus

Genus.	Whence received.	No. of fleas exam'd.	*Xenopsylla cheopis.*	*Ctenopsylla musculi.*	*Cerato phyllus fasciatus.*	*Ctenocephalus.* ?
M. rattus ..	Plague Inf. area.	102	60	38	3	1
M. decumanus.	Non. Inf. area.	180	118	49	3	10

A species of tick, subfamily *Ixodinae*, type *Ixodes*, was found in great numbers on some *M. decumanus* and some *M. rattus.* A species of louse, probably of the family *Haematopinidae*, was also noted on both species of rats.

With regard to the twelve rats from which *B. pestis* was isolated, the only constant finding was definite serous exudation into the pleural cavity and pallor of the liver. Two of these rats (caught alive) showed general superficial glandular enlargement with haemorrhagic inflammation around. No rat showed a solitary bubo. Glandular infection, when present in rats found dead, tended to be generalised and corresponded to that seen in the two rats caught alive. There was black and white mottling of the liver, but not in all. In two cases the spleen was much enlarged and in one it was also granular, while in a fourth it was very small. In one only was the omentum and mesentery congested.

Marked variation in the morphology and staining characters of the organism was noted on agar plate or tube growths, the amount of moisture of the agar apparently influencing the character of the growth. Coccal and very short bacillary forms, generally including some oval bipolar staining forms, were not infrequent in the drier agar, while more typical forms and staining were noted from very moist agar, especially from the condensation water.

Rat and guinea-pigs were used for inoculation experiments, receiving 1 cmm. loopful of agar culture or infected organ or two drops of broth culture subcutaneously. The guinea-pigs were also infected by stratching some organ or culture into the skin. Once only was the initial injection into a rat of a piece of infected tissue negative, though 1 cmm. of the agar culture thereof was positive when injected later into another rat. Immunity against *B. pestis* infection by the skin method was produced by 2 cc. of anti-plague serum (Lister Institute). Infection by subcutaneous inoculation needed more serum, at a dose of 5 cc. it always prolonged the date of death, localised the infection into a gland in the neighbourhood of the site of inoculation or occasionally gave complete immunity.

"*Agglutination and absorption tests.*—In the application of the agglutination test we have employed the time measurement slide method and a longer method. Both have afforded useful indications. A stock emulsion was made by (1) washing off in saline a 48 hours' moist agar growth at 37° C, centrifugalising it, rewashing the deposit in saline, then recentrifugalising it and emulsifying the deposit in formalised 2 per cent. saline, (2) growing the bacillus in broth at 37° C. for 48 hours, when a very turbid fine nonflaky growth should be obtained. This was formalised. Of the two we found the latter more advantageous, especially when employing the longer method. There was less tendency to cohesion in broth cultures when left standing to test agglutinability.

"The above slide method was found useful in rapidly testing suspected growths from the blood or organs on moist agar. From an agar slope in a test tube a little of that growth bordering on the water of condensation was taken. A drop of a specific agglutinating human serum, diluted 1 in 6 was put on a slide and a colony was rubbed into it. *B. pestis* colonies showed agglutination. Later broth cultures thereof were tested and found to agglutinate on the slide and by the longer method carried out in the usual way. The strains of *B. pestis* isolated were only agglutinated in low dilution of the antiserum.

"Regarding the sera of patients we found the agglutination test of value in the cases investigated. When the case was admitted at a date when suppuration in the gland prevented the isolation of the bacillus, we found the sera agglutinated the *B. pestis* isolated from another case. The sera of cases sent to the Lazzaretto for observation on account of glandular enlargements due to undetermined causes, remained negative, and these results were consistent with clinical observations.

"The sera of two cases admitted early in their infections with diagnosed *B. pestis* was in one case negative on the 13th, slightly positive on the 23rd, and positive on the 36th day from onset in a 1 in 6 and a 1 in 10 dilution. Two days later it was positive also in a 1 in 20 dilution. In the second case the serum was negative on the 5th and 15th, but positive on the 22nd day from onset in a 1 in 6 and 1 in 10 dilution. Fourteen days later it gave a partial agglutination in a 1 in 20 dilution.

"The human sera agglutinated the *B. pestis* isolated from man more readily than either of two strains isolated from two rats.

"The serum of the case that died gave a higher specific agglutinin action than did any of the other cases.

"Castellani's absorption test was carried out by first determining the degree of agglutinin action present in the sera as recommended in this test by one of us. The dilution that gave complete agglutination within one minute was employed. Three drops of the serum diluted only to half this dilution factor was mixed in a sedimentation tube with three drops of the growth in formalised broth or of a dense emulsion in formalised saline from an agar culture. The tubes were capped and left standing at laboratory temperature for 24 hours. Results showed that the *B. pestis* isolated from man and strains isolated from rats removed the specific agglutinin previously present for all in human or in prepared animal anti-plague serum."

R. St. J. B.

Brooks (Ralph St. John). The Influence of Saturation Deficiency and of Temperature on the Course of Epidemic Plague.—*Jl. of Hygiene.* Plague Suppl. 5. 1917. May 9. pp. 881–899. With 18 charts.

An interesting paper in which the influence of saturation deficiency and temperature on the incidence and decline of plague epidemics in India and certain tropical islands is fully dealt with.

The knowledge that plague epidemics in India decline at the onset of the hot season; and that, even when the temperature is favourable, certain conditions of atmospheric humidity cause the cessation of epidemic plague, led the author to investigate the critical point at which these two factors come into play.

Saturation deficiency is defined as "the difference between the actual tension of aqueous vapour present in the atmosphere at the temperature in question, and the tension of the aqueous vapour that would be present in a saturated atmosphere at the same temperature."

From the data collected by the Plague Commission relative to deaths from plague, temperature and percentage saturation of the atmosphere in certain districts of India, Dr. Brooks has calculated the saturation deficiencies and plotted a number of curves which illustrate the combined influence of these factors in terminating an epidemic. The author summarises his results as follows:—

"1. Plague does not maintain itself in epidemic form when the temperature rises above 80° F. accompanied by a saturation deficiency of over ·30 of an inch.

"2. Plague epidemics are rapidly brought to an end in the presence of a high saturation deficiency even when the mean temperature throughout and after the termination of the epidemic has been considerably below 80° F.

"3. Plague epidemics may commence and increase in intensity when the mean temperature is well above 80° F., provided that the saturation deficiency is below ·30 of an inch.

"4. In some districts of India and in certain tropical islands (*e.g.* Java, Mauritius) where the climatic conditions are at all times of the year favourable to the incidence and spread of plague, the disease may occur indifferently at all seasons."

The adverse influence of high temperature and saturation deficiency on plague epidemics is explained in Dr. Brooks's opinion, by their effect on the duration of life of the rat flea (*Xenopsylla cheopis*) when separated from its host.

R. P. Cockin.

Davies (D. S.). An Outbreak of Bubonic Plague in the City of Bristol. *Public Heath.* 1917. May. Vol. 30. No. 8. pp. 176–180.

The appearance of sporadic cases of plague infection in Bristol during July and August 1916 has already been reported by Rendle Short [this *Bulletin*, Vol. 9, p. 87]. The present communication deals for the most part with the measures taken to ascertain the state of infection of the port. Rats caught both on the dock premises and on ships in the harbour both at Avonmouth and Portishead were examined, and, in addition, rats were collected by the rat-catcher employed constantly by the Docks Committee, and also by two additional rat-catchers lent by the Admiralty.

Over 8,000 rats were caught and examined from the city and the port. Of the first 432 rats examined six were plague infected (all from the original rag warehouse). No plague rats were found in the samples from the other localities examined. The majority of these rats were *Mus decumanus* (vel *norvegicus*), but a certain number of *Mus rattus* with its varieties, *alexandrinus* and *rufescens*, were taken from the Avonmouth Dock Area. All the rats taken from the rag warehouse were *Mus decumanus*. On one of the plague rats, caught on the first floor of the rag factory, a flea was found which was identified by ROTHSCHILD as *Xenopsylla cheopis*; on the remainder of the rats the ordinary brown rat flea (*Ceratophyllus fasciatus*) was found in large numbers, together with several types of lice. Systematic examination of rats was continued in the city and docks for six months, but no further cases of rat plague were discovered.

R. St. J. B.

WU LIEN-TEH & EBERSON (Frederick). **Transmission of Pulmonary and Septicaemic Plague among Marmots.**—*Jl. of Hygiene.* 1917. July. Vol. 16. No. 1. pp. 1–11.

This communication is substantially the same as that which appeared earlier this year in the *Journal of Infectious Diseases* [see this *Bulletin*, Vol. 9, p. 480].

It contains in addition, however, the following note on the ectoparasites from marmots by Professor G. H. F. NUTTALL:—

"Accompanying a letter dated 16th August 1916, Dr. Wu Lien-Teh forwarded some specimens of ectoparasites collected by him from marmots.

"1. A single flea: The specimen was determined by Hon. N. C. Rothschild as a slightly aberrant example of *Ceratophyllus famulus* Jordon and Rothschild, 1911 (*Proc. Zool. Soc. London*, 1911, p. 380, No. 7, text-fig. 115).

"2. A number of ticks: The specimens consisted of but a single female accompanied by a number of nymphs, some mounted in balsam, others not. Mr. C. Warburton examined the specimens and determined them as *Haemaphysalis*, one of the variants of *H. leachi*, closely resembling the form described as *H. konigsbergi* Warburton and Nuttall, 1909 (see *Ticks, a Monograph of the Ixodoidea*, 1915, Part III, p. 468, figs. 408–410). It is desirable that more adults should be secured, including both sexes, to enable a precise determination to be made. Specimens should be preserved in 70 per cent. spirit."

R. St. J. B.

WADE (H. Windsor). **Carbohydrate Fermentation by *Bacillus pestis*, comparing Certain American and Oriental Strains. With Analysis of Discrepancies of Fermentations with Hiss's Serum Water, Litmus Agar, and Bouillon.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1916. July. Vol. 11. No. 4. pp. 159–182.

The strains of *B. pestis* used in these experiments included a culture isolated in 1912 from a rat in New Orleans, three from human cases in the 1914 New Orleans invasion (suggested at the time by the Federal authorities to have come from Liverpool), five isolated from cases in the Philippine Islands, and one avirulent strain. Cultivations were carried out on Hiss's Litmus serum-water media, on litmus-sugar agar slants, and in sugar bouillons, phenolphthalein titrations, containing 0·5 per cent. and 1 per cent. of the various sugars. Of the three methods of determining acid production, titration of sugar bouillons proved to be by far the best, salicin, arabinose, galactose and maltose being regularly fermented in this medium while the results obtained with Hiss's medium and litmus agar were either negative or weak and irregular. The following table exemplifies this point:

Medium.	Litmus serum-waters.		Litmus agars.		Bouillon (titrations).		Remarks.
	0·5 per cent. sugars.	1·0 per cent. sugars.	0·5 per cent. sugars.	1·0 per cent. sugars.	0·5 per cent. sugars.	1·0 per cent. sugars.	
Dextrose ..	++	..	++	..	++	..	Strong.
Mannite ..	++	..	++	..	++	..	Do.
Levulose ..	+	+	+	..	++	..	Do.
Maltose ..	+	+	+	+	++	++	Moderate.
Arabinose .	(+ ?)	+		+	+	+	Weak.
Galactose .		∓		+	+	+	Do.
Salicin ..		+	-	+	+	+	Do.
Glycerin ..		-	+	+	+	+	Irregular.
Dextrin ..		—		..	(+ ?)	(+ ?)	Negative.

Comparison of the different strains failed to demonstrate any significant distinction, qualitative or quantitative, between the Oriental and American strains of plague; indeed the strains exhibited a remarkable agreement, except with regard to the fermentation of glycerin. Two of the Manila strains fermented in this medium, the remainder of the Manila strains and all the New Orleans strains gave no reaction. Generally speaking dextrose, mannite, and levolose are fermented regularly and fairly strongly. Maltose, arabinose, galactose, and salicin are also fermented, but more irregularly, except under favourable conditions. Dextrin, lactose, saccharose, raffinose, adonite, dulcite, amygdalin, inosite, sorbite, nutrose, and inulin are not changed in reaction. There is a well-defined maximal point of acid tolerance, which is fairly uniform in the same medium for different strains. This ranges from 2·5 to 3·0 per cent. acid for beef-extract broths and from 3·8 to 4·2 per cent. for veal-infusion broths. There are slight differences in the highest acidities with the different carbohydrates. The maximal point is not changed by increased percentage of the sugar or differences in the original reaction.

The types of media and the different sugars used had various effects, some of them very definite and constant, on the amount of growth and on the morphology of the organism. On dextrose, mannite and levulose, in which medium fermentation begins promptly, smears uniformly show much degeneration and involution. When, however, acid production is delayed, degeneration and involution occur to a less extent. The cultures on sugars not acidified give well-stained organisms, though variation in morphology in different instances is marked. Salicin usually produces long, often thready and at times almost filamentous organisms (*B. proteus* type), not at all recognizable as as *B. pestis*. Dextrin and arabinose also show this tendency. Glycerin induces the formation of short, chunky, deeply staining bacilli, often showing the typical bi-polar appearance of *B. pestis* in exudates. In a very few instances there were encountered long pale organisms with deeply stained polar bodies, indistinguishable from *B. diphtheriae* stained with Loeffler's methylene blue.

> "The morphology in dextrose and mannite bouillons differs as widely from that on the similar agars as do the quantities of growth on these media. Here is found with regularity extensive, typical chain formation, often with an almost sheath-like capsular layer. In media containing substances such as glycerin and arabinose, which are not fermented and in which growth is not heavy, chain formation is not a feature and loose bacillary forms predominate. Stalactites do not develop in such media. Galactose bouillon, it may be noted, produces typical, short, bipolar forms rather more constantly than any other. Filamentous forms occasionally appear which, particularly when tangled, resemble streptothricial organisms; they do not occur regularly enough to seem characteristic features of any particular medium."

R. St. J. B.

EBERSON (Frederick). **On the Nature of Plague Proteotoxins.**—*National Med. Jl. of China.* 1917. Mar. Vol. 3. No. 1. pp. 10–16. *Jl. Infect. Dis.* 1917. July. Vol. 21. No. 1. pp. 56–61.

The author has extended his previous studies on the nature of plague proteotoxins, in which he showed that shock-producing poisons could not be obtained with *B. pestis* when the organisms were unsensitized, however the proportions of bacteria and complement and the time element were varied.

The following is typical of the results obtained in this series of experiments. Rabbits were substituted for guinea-pigs used in the original experiments and horse serum was used instead of guinea-pig serum for the production of proteotoxins. One and a half agar slopes of *B. pestis* were sensitized at 37° C. for one hour with 1·8 cc. inactivated serum from a rabbit. 10 cc. of normal horse serum were incubated for 14 hours in contact with the washed sensitized bacteria. After centrifugation, the supernanant fluid was heated for 35 minutes at 50–51 ° C. and injected intravenously.

The following is typical of the results obtained—

Rabbit.	Weight.	Dose.	Result.
1	567 gms.	5·0 cc.	Severe shock. Fell to side at once. Dyspnoea, twitching and pawing. Recovered in one minute. Died next day.

The author concludes that

> "the toxemic manifestations of plague bacteria are of a different nature from those which have been described for other organisms such as the *B. typhosus*, for example. The most striking feature of *B. pestis* from the standpoint of poison production is the strict requirement of sensitization. In the case of other bacteria studied, this has never been encountered, to the writer's knowledge. Sensitization has usually hastened the formation of proteotoxins but has not been an indispensible factor in the process, since unsensitized bacteria gave rise to powerful poisons equally as well. The significance of this point does not immediately become apparent, but suggests likely explanations for the mechanism of plague infection, the relationship existing between proteotoxins and bacterial virulence and the possible importance of an antigen-sensitizer complex in the production of shock."

R. St. J. B.

Maruyama (H.). [Resistance of the Frog to Injections of Plague Bacillus.—*Taiwan Igakukai Zassi.* 1916. Oct. 28. No. 168. pp 837–842. [Abstract based upon Review by R. G. Mills, in *China Med. Jl.* 1917. Mar. Vol. 31. No. 2. p. 178.]

Plague inoculation experiments made with *Rana tigerina* (Daudin) showed that this species of frog was able to resist a dose of plague organisms equivalent to three slants per 90 gms. of body weight. This extreme resistance was found to be due to the phagocytic action of the polymorphonuclear leucocytes. A guinea-pig died in 2–4 days after an injection of only 1/50 of a loop of the same culture.

R. St. J. B.

Stallybrass (C. Oswald). **The Control of Rat Plague.**—*Jl. State Med.* 1917. Apr. Vol. 25. No. 4. pp. 116–121.

This is a brief discussion of the various methods employed in the control of the rat population in ports and on board ship. The author lays particular stress on the necessity for persistent trapping as, in his opinion, the results obtained by fumigation, the use of rat guards and rat proofing are often unsatisfactory. He draws attention to the way in which rats may escape the most strenuous application of the Clayton apparatus, live rats being found in the life-boats and even in the mast itself, after fumigation. Photographs have been taken of rats in the act of crossing rat-guards, and while better types can perhaps prevent rats from crossing, they are so easily and generally displaced as to be of little value. In any case the liability of rats to go ashore in crates, boxes, etc., renders the use of rat-guards very futile. The author has himself observed, in the waters of Bombay harbour, rats climbing down the anchor chain and swimming to the shore. The employment of rat catchers on shipboard was inaugurated in Liverpool some twelve years ago, and some 50,000 rats have been destroyed in this way.

With regard to the efficacy of trapping, so far as ships arriving at the port of Liverpool are concerned, there is a noticeable decrease in the number of rats met with in recent years.

R. St. J. B.

ENTERIC FEVERS IN THE TROPICS.

Leza y Lopez (Francisco). **Contribucion al estudio de las infecciones tificas en Cuba. Tesis presentada en Opción al Premio Clin. Curso de 1914 a 1915.** [A Contribution to the Study of Typhoid Infections in Cuba.]—*San. y Benefic. Bol. Ofic.* 1916. Apr.-June. Vol. 15. Year 7 Nos. 4–6. pp. 575–691.

A graduation thesis, based on the study of 54 cases of typhoid infection, paratyphoid cases being included. The author summarizes his principal conclusions as follows:

1. Typhoid fever is most prevalent in Cuba in the summer, the most dangerous age being between 20 and 40 years. More whites die than blacks, and more men than women.
2. Local epidemics are more often due to the presence of germ-carriers than to water-infection.
3. The invasion is generally insidious, the usual prodromal symptoms being marked in the majority of cases.
4. The type of the disease is generally benign.
5. Sero-diagnosis is very desirable, in the doubtful cases, if it can be done properly.
6. The problem of diminishing the mortality from enteric fever in Cuba reduces itself to the hunting-down of germ-carriers.

J. B. Nias.

Bowman (F. B.). **An Expeditious Method for the Study of Enteric Stools: A Report on the Examination of 1,200 Specimens of Faeces for Enteric Organisms.**—*Brit. Med. Jl.* 1917. Aug. 25. pp. 250–251. With 1 fig.

" A minimum of culture media, glass-ware, etc., is required, and the culture media are easily prepared."

1. *Peptone Water.*

Peptone (Baird and Tatlock)	10·0
Sodium chloride	5·0
Water	1,000·0

Dissolve in autoclave for five minutes, shake, filter, sterilize at 15 lb. for fifteen minutes. Each tube to contain about 5.0 cc.

2. *Endo's Medium.*

Leibig's extract of beef	10.0 cc.
Sodium chloride	5·0 „
Peptone	10·0 „
Water	1,000·0 „

Dissolve in autoclave at 120° C. for five minutes. Add 30·0 gm. washed agar and autoclave at 120° C. for fifteen minutes. Filter and neutralize to litmus. Add 10·0 cc. of 10 per cent. solution of sodium bicarbonate and 10·0 gm. lactose. Place in steamer for half an hour. For plates melt stock and add 5·0 cc. alcoholic basic fuchsin (fuchsin 3·0 gm., alcohol 57·0 cc.), and 25·0 cc. of a 10 per cent. solution of sodium sulphite. Steam for fifteen minutes and pour into plates. Cool and store in the dark. A circle of blotting paper in the lids of Petri dishes will absorb water of condensation.

3. *Hiss Medium.*

Leibig's extract	5·0 cc.
Sodium chloride	5·0 „
Distilled water	1,000·0 „

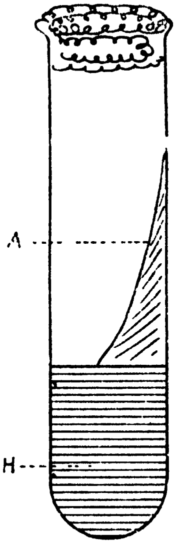
Dissolve at 120° C., add 8.0 gm. washed agar and melt at 130° C. for five minutes. Add 80·0 gm. washed gelatine, dissolve and cool to 45° C. Clear with white of egg at 120° C. for five minutes, filter and to filtrate add 1 per cent. of dextrose and sterilize for half an hour. This medium at 37° C. remains solid and will retain gas bells.

4. *Standard Agglutinating Serums.*

Obtained from "R.A.M.C." College, Millbank, and from the Standard's Laboratory, Oxford.

Piece of faeces size of a pea is emulsified in a tube of Peptone Water (1), allowed to stand for half an hour. It is then ready for plating. Endo plates should be dry and a faint pink colour. The plates are incubated over night and examined for suspicious colonies. *B. coli* being an acid producer will appear as beautiful golden metallic colonies and streptococci as small, crimson dots; any grey colonies with no metallic lustre are suspicious. Remove these and make stab cultures in Hiss tubes (3) and streaks on sloped agar. See figure.

Place tubes in incubator at 37° C. overnight. If there are any gas bubbles in the medium the tube is discarded. Proceed next with agglutination tests with dilutions of 1 : 20 to 1 : 500. An emulsion of *B. coli* should also be used as a control.



A, Plain agar slope.
H, Hiss medium.

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J. H. Tull Walsh.

BOTELHO (C.). **Sur un nouveau milieu de culture indiquant rapidement la présence de bacilles du groupe typhique dans un milieu bactériologiquement impur.**—*C. R. Soc. Biol.* 1917. May 5. Vol. 80. No. 9. pp. 435–437.

The principle upon which this "milieu" is based rests upon properties, observed and studied by the author, as shown by: "typhoid and paratyphoid bacilli growing in the culture medium. They exhibit in the new medium certain qualities earlier, or differing from, those shown by *B. coli communis* and other germs of the intestinal flora which are found in impure 'cultures'; these are:—blue coloration of a solution of Amann's lactophenol with Poirier C_4B blue ('bleu coton') incorporated in glucose agar and neutralized, warm, with NaOH, 2 per cent. in distilled water."

1. **Amann's Lactophenol:—**

Pure lactic acid	1 part.
Glacial phenic acid (Carbolic acid)	1 part.
Glycerine	2 parts.
H_2O, distilled	1 part.

2. Solution:—

Cotton Blue	0·50 cgm.
Lactophenol (1)	30·0 gm.

(Mix, do not filter and dilute by 1/3 with distilled water).

3. Syrup:—

Crystallized white sugar	200 gm.
Water	100 „

Mix cold, then boil, shaking well until the sugar is completely dissolved; filter through flannel.

4. 2 per cent. NaOH in distilled water.

5. Agar gelose:—

Water	1,000 gm.
Sea salt	5 „
Chapoteaut's peptone	10 „
Agar-agar	15 „

Put into a porcelain bowl, boil, filter and sterilize, without neutralizing.

The final culture medium is prepared as follows:—

Put into a flask 100 gm. of No. 5, liquified in a water-bath, add 2 cc. of No. 2, and 10 cc. of No. 3. Mix well, boil over wire-cloth, add, after boiling, 7 cc. of No. 4 and boil again until the agar is completely decolorized; pour the medium into small (about 3 cc.) tubes and sterilize. Inoculate by stabs. Control tubes should be used with identified bacilli of various species and with those of *Enterica*.

If later disengagement of gas in tubes showing the marked blue colour is observed, one may guess at the presence of *Enterica* A or B.

J. H. T. W.

Leboeuf (A.) & Braun (P.). **Note sur les résultats de 12,000 hémocultures.**—*Ann. Inst. Pasteur.* 1917. Mar. Vol. 31. No. 3. pp. 138–154.

As the result of their very extended investigations the authors, both of them medical officers, with the rank of "Major" in the French Medical Army Corps, record the following "conclusions" in reference to the three well-known species of the genus *Enterica*, and to certain allied, but atypical bacilli.

"1. During the course of the war paratyphoid A has had a considerable extension, which seems to us due to the special epidemiological conditions of the campaign.

"2. Anti-typhoid and anti-paratyphoid vaccinations have been most useful and should be continued.

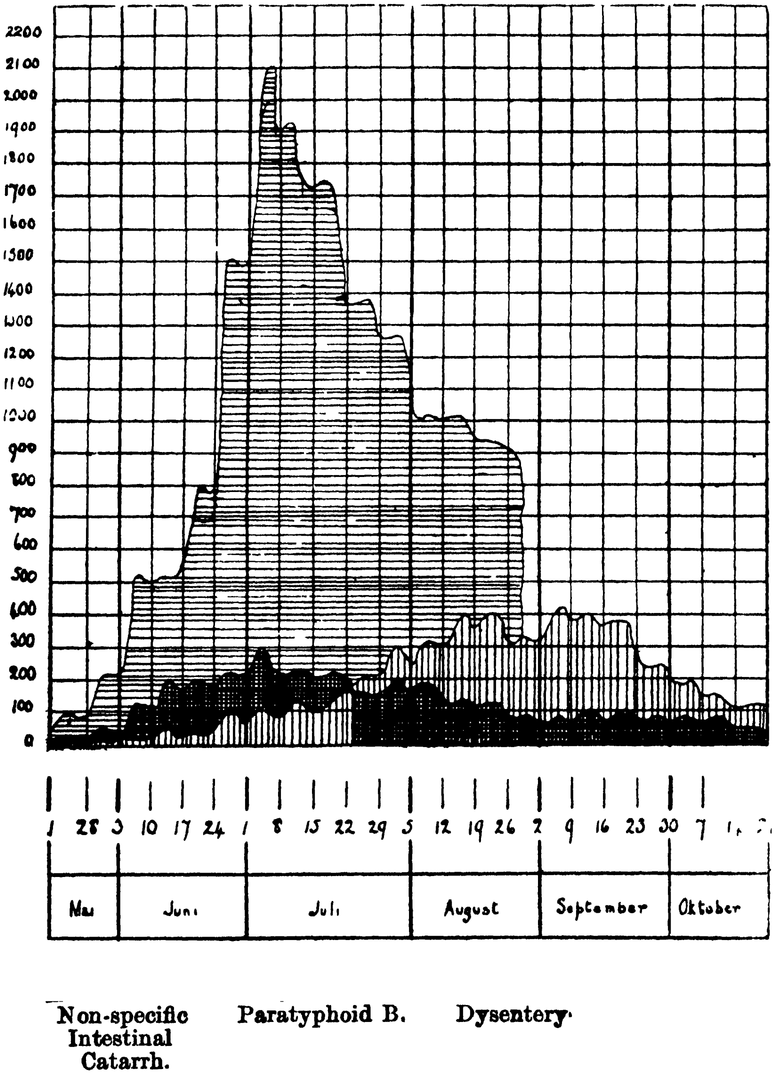
"3. The existence of typhoid states due to cocci which are Gram-positive appears to us doubtful and extremely rare.

"4. Serum-diagnosis, carried out under certain conditions, is able to render precious service to diagnosis of enteric fevers."

J. H. T. W.

SLUKA (Erich) & STRISOWER (Rudolf). **Betrachtungen über die Epidemiologie der Ruhr und des Paratyphus B.** [Dysentery and Paratyphoid B.]—*Wien. Klin. Woch.* 1917. Mar. 15. Vol. 30. No. 11. pp. 337–340. With 4 charts.

On a certain front with which the authors were connected as army medical officers the general health of the troops was good at the end



Curve showing Incidence of Paratyphoid B and Dysentery.

of May, 1916. From June onward the number and type of dysentery cases became more noticeable. Cases of paratyphoid B fever appeared and increased in number and severity.

Studying the statistics available the authors form the following conclusions concerning the epidemiology of paratyphoid B infections:

B. paratyphosus B infects the organism either by contagion or on food material, and all flesh eating animals are liable to suffer from this infection, which shows itself in many different ways. [Examples will be found in Vols. 9 and 10 of the *Bulletin.*] This bacillus is peculiarly connected with a flesh diet.

In certain conditions of health and environment (War, etc.), the bacillus may acquire extreme virulence.

J. H. T. W.

AZZO (Azzi). **Ancora su alcune specie anomale di bacilli del paratifo, isolate da soldati infermi nella zona di guerra.** [Atypical Paratyphoid Bacilli isolated from Soldiers in the War Zone.]—*Sperimentale.* 1917. July 21. Vol. 71. No. 3. pp. 210–222.

As with all created things we find variation among bacilli, no two are *exactly* alike. With herb, horse and hound differences used in classification are morphological and plainly visible, behaviour towards environment being of secondary importance in many instances. With bacilli morphology is very simple and we can make little use of it. We must rely on behaviour to, and in, environment for differentiation of species and varieties. For similar work see *Bulletin,* Vol. 8, pp. 73–78 and Vol. 9, pp. 1–6.

J. H. T. W.

FLEISCHNER (A.). **Salvarsan bei Typhus.** [Salvarsan in Enteric Fever.] —*Geneesk. Tijdschr. v. Nederl.-Indië.* 1917. Vol. 57. No. 1. pp. 56–59. With 1 chart.

Acting on a recommendation of JACOB in the *Munch. Med. Woch.*, the author gave two doses of salvarsan, the first of 0·10 gm. and the second of 0·15 gm. of old salvarsan at four days interval to a patient who had been ill for 10 days with symptoms of enteric fever. The temperature commenced to fall immediately after the first dose and reached the normal on the 21st day of the disease. The author is very enthusiastic over the improvement produced in the patient by these injections. Quoting Professor JACOB, he says "Words cannot describe the difference." The idea is that salvarsan acts on the bacilli circulating in the blood, as a *Therapia sterilisans magna.*

J. B. N.

GOUBAU (F.). **Traitement des Convalescents typhiques et paratyphiques porteurs de germes par l'autovaccination à doses répétées.**—*Arch Med. Belges.* 1917. July. Vol. 70. No. 7. pp. 590–601.

Recognizing the danger presented by "carriers" the author has tried to eliminate quiescent germs by repeated vaccination. Dr. Goubau states that this method of treatment "cannot fail to bring to the 'carrier' an efficacious aid in his continual struggle against the microbes, up to the moment when it confers upon him the power of expelling the offending bacilli." Two conditions are essential :-

1. A strict use of the particular species

2. Strong single doses or doses frequently repeated so as to augment the antibodies present in the blood.

"Of 23 patients treated during the first five months of their convalescence no one of them remained a 'carrier' at the end of the second month after the treatment was commenced.

"An injection was given once a week, prolonging the treatment until successive examinations showed that the germs were no longer present.

"The first injection (1,000,000,000 per cc.) for unprotected typhoid cases and for paratyphoids was 0·5 cc.; for persons already protected—typhoid 1 cc. Subsequently the dose was for each case 1 cc. In certain resistant cases 2 cc. were given at each injection. The injections were generally without serious reaction."

J. H. T. W.

WIDAL (F.) & SALIMBENI (A. T.). **A propos de la vaccination mixte antityphoïdique et antiparatyphoïdique A et B par une seule injection.**—*Presse Med.* 1917. Aug. 16. Vol. 25. No. 46. p. 473.

See this *Bulletin*, Vol. 9, p. 469, for previous "article" by Widal and Salimbeni in which they first tried increasing the dose of vaccine and reducing the number of injections. The present report puts the matter a stage further on as the answer to a question posed by the authors:—

"Can we advance further and, by a single injection obtain a satisfactory immunity?" They consider that this object can be attained by a single injection of 1·5 cc. (heated T.A.B.) which contains 6,000,000,000 germs. They admit that further experience is required for definite proof.

J. H. T. W.

With reference to the review of "An Enteric-like Fever in the Anglo-Egyptian Sudan" (CHALMERS and MACDONALD) published on pages 10–12 of Vol. 9 of this *Bulletin*, Dr. A. J. CHALMERS writes that he regards it as misleading. His letter is reproduced almost *in toto*:

(*a*) In the introduction to the paper in question we clearly state:—"As this organism does not appear to have been described, and as its recognition compelled us to devise some scheme by which the bacilli of this group could be readily recognised, we venture to bring forward the following remarks."

We therefore aimed at a bacteriological paper and there is therefore no necessity for the first note of exclamation, *i.e.*, the one at the end of the first paragraph of the review.

(*b*) We summarized the clinical symptoms clearly by stating:—"and with all the usual signs and symptoms of a mild attack of typhoid fever." I submit that as these signs and symptoms are well known it was unnecessary to repeat them at tedious length, and that the only reliable method of differentiation of such fevers is by a study of the causal organism.

(*c*) We clearly stated that the bacillus was non-motile and fermented lactose producing acid and gas and we gave the amount of acidity as 2·7 cc. of $\frac{N}{20}$KHO. I submit that these statements render it *impossible* for the bacillus to be *B. paratyphosus* A.

(*d*) I regret to say that I cannot understand the reviewer's references to the patient's serum and the bacillus. Unless wrongly printed his remarks appear to me to be in favour of the bacillus being distinct from *B. paratyphosus* A because it agglutinated with the patient's serum quite well, while with regard to *B. paratyphosus* A he says :—" even when typical always shows a very low titre with a patient's serum."

(*e*) I am afraid that I fail to understand the reason for the second note of exclamation following the words " in good condition." It is a necessary precaution to test the titre of a serum and to state whether or not you consider it to be in good condition before drawing deductions as to its action upon a given organism.

(*f*) The Reviewer has omitted all mention of the following points which are pertinent to his contention that the bacillus may be *B. paratyphosus* A : 1. " *Time* " in the agglutinations of the organism in question. 2. The fact that the agglutination of the organism with the specific Paratyphoid A serum, strength 1 in 50 was *generally only partial* and only in one instance completely. 3. Tests with *B. coli* specific serum. 4. Tests with *B. paratyphoid* B specific serum. 5. Deductions drawn from the serum tests. 6. The fact that the organism does not stand alone but is closely related to two described by Professor Castellani, viz., *B. entericus* and *B. giumai* and with these bacilli forms a definite subgroup of the Typhoid-Colon group. This subgroup is carefully defined on page 13 of the reprint and is called " *The Entericus Subgroup.*" 7. The trouble which was taken to differentiate *B. khartoumensis* from known allied organisms, as he merely states " the *genealogies* of many bacilli are graphically stated," but he does not say why. 8. The conclusions arrived at by the authors, and this is unfortunate because had he done this it would have prevented any possible misunderstanding on the part of the reader, no matter what might be stated in the body of the review.

Other points might be quoted but I think I have brought forward sufficient evidence to show that the review and the paper are at variance. . . .

I submit that the extracts given by the Reviewer could not possibly enable a reader to form a correct opinion as to the contents of the paper, and I further submit that the Reviewer has *missed the whole point* of the paper.

In reply to these strictures the Reviewer writes:—

The sectional sub-editors can only judge of work sent to them by the written word and as I read Dr. Chalmers's paper I could not see any very good evidence for a distinctly new disease. Dr. Chalmers must not expect everyone to agree with him and I cannot see anything in the " Notice " to which he can object. In the last para. of the " Notice " I gave my reasons for hesitating to accept the disease as *distinctly new*. In that paragraph I have given certain references to similar instances. Dr. Chalmers himself calls the fever " Enteric-like."

SPRUE.

DOLD (Hermann). **Ueber die Aetiologie der Spru.** [On the Cause of Sprue.]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. Jan. Vol. 21. No. 1. pp. 1–16.

Bacteriological and Experimental Researches on the Etiology of Sprue.—*Med. Record.* 1917. Feb. 3. Vol. 91. No. 5. Whole No. 2413. pp. 191–193.

A large number of stools were tested for the presence of yeasts with the following results :—

Normal faeces	Yeasts detected in	7·5	per cent.
Diarrhoea (not sprue)	,, ,, ,,	16	,, ,,
Faeces from cases of sprue ..	,, ,, ,,	92·1	,, ,,

Either blastomycetes or Oidia or both were present in the sprue stools. These organisms were found to give acid and gas on all kinds of sugars, glucose, lactose, saccharose, maltose, and mannite, which explains the acid reaction and gaseous character of the sprue stool. When either of these organisms was mixed with bread or rice and fed to mice, a diarrhoea closely resembling that of sprue was produced which ended fatally. Monkeys refused food contaminated in this way, but one of two dogs contracted a transient diarrhoea. BAHR in Ceylon and ASHFORD in Porto Rico report the isolation of a species of Oidium or Monilia from sprue stools, which they consider to be the cause of the disease. In China although Oidium often occurs, Blastomycetes appear to be in the ascendancy. The two organisms are closely related. Serological agglutination, and complement fixation reactions have given no help in deciding the aetiology of sprue.

The decrease in size of the liver, which is a rather striking feature even in the early stage of the disease, may be partly attributed to "carbohydrate hunger." Carbohydrates are quickly decomposed in the digestive tract by the specific organisms, leaving little or none to be absorbed and deposited in the liver as glycogen.

E. E. Atkin.

ELDERS (C.). **Darmflora bij Indische spruw.** [The Intestinal Flora in Sprue.]—*Nederl. Tijdschr. v. Geneesk.* 1917. Vol. 1. No. 15. pp. 17–20.

UNGERMANN (*Münch. Med. Woch.*, 1914, No. 2) and BENEKE and JUSTI have found in the stools of cases of sprue large numbers of Gram-positive bacilli, which exhibit polar staining and generally resemble diphtheria bacilli. BENEKE thinks that these are the cause of sprue. The author has been able to isolate similar bacilli from a typical case of sprue which was placed at his disposal by VAN DER SCHEER, sometimes almost in pure culture in the stools. With Neisser's stain they gave blue polar-staining with brown coloration of the body of the bacillus, and on glycerin-agar, after 24 hours at 37°, a growth was obtained of similar bacilli in small gray colonies with waved edges. Milk curdled in four days, and then smelt sour. The bacteria were motionless and did not form spores. Lactose, glucose and mannite were fermented. The bacteria grew best anaerobically, and formed in glucose-agar stab-cultures colonies having a thick stem with branching outgrowths. In gelatine no growth was obtained. In a five-days' old anaerobic culture threads of various thicknesses were found, having swellings at intervals and containing Gram-positive oval bodies, and also acid-fast spherical clubs. These, however, were killed by heating to boiling point for only three minutes, so that they could not have been spores.

The author goes on to enquire whether these bacilli, which manifestly resembled those obtained by UNGERMANN, were not the bacillus of lactic acid, derived from the milk diet on which the patient had been placed.

J. B. Nias.

SCHUERMANN (W.) & FELLMER (T.). **Ein Beitrag zur Kenntnis der Aphthae tropicae (Sprew, Sprue).** [A Contribution to our Knowledge of Sprue.]—*Zeitschr. f. Hyg. u. Infektionskr.* 1916. Vol. 81. pp. 432–443.

The authors have isolated a bacillus from the stool of a sprue patient which they consider may possibly be the cause of the disease. It is a diphtheroid organism, which agglutination tests show to be closely allied to the Xerosis bacillus. Complement fixation tests were positive.

E. E. A.

BREINL (A.) & PRIESTLEY (H.). **Sprue in North Queensland.**—*Med. Jl. Australia.* 1917. Feb. 3. Vol. 1. No. 5. pp. 95–100.

This is mainly a general account of the disease. One point is worth mentioning. The similarity of the symptoms of sprue to those of some diseases of the pancreas suggested some animal experiments. It was found however that dogs that had had a portion of the pancreas removed did not contract any disease akin to sprue when fed with sprue faeces.

E. E. A.

MISCELLANEOUS.

i. MANSON (Patrick). **Tropical Medicine and Hygiene.**—*Brit. Med. Jl.* 1917. July 28. pp. 103–109.

ii. MCCARRISON (R.). **India and Medical Progress.**—*Ibid.* pp. 109–112. With 11 figs.

i. In this interesting account of discovery in tropical medicine and hygiene the distinguished author treats chiefly of the diseases which are caused by protozoa and helminths. He excludes bacterial diseases such as plague and cholera, but beriberi, vomiting sickness of Jamaica, and certain skin diseases come under his survey. He does not touch on blackwater fever or snake bite [on the treatment of which such valuable work has been done by ACTON and KNOWLES (this *Bulletin*, Vol. 9, p. 237)] and only incidentally on amoebiasis. The work which is reviewed is chiefly that of British doctors. On the subject of schistosomiasis, after stating that till quite recently the life history of the worm and the channels by which it enters the human body were unknown, the author continues: "Dr. Leiper of the London School of Tropical Medicine, by a series of brilliant observations and successful experiments, has now completely filled in the hiatus in our knowledge, and has thereby placed in the hands of the sanitarians a sure guide in developing methods for the prevention of a disease which hitherto has proved the despair of the therapeutist."

ii. A well-written account of the advances in tropical medicine and surgery owed to the Indian Medical Service.

A. G. B.

TURNER (G. Grey). **Medical and Surgical Notes from Mesopotamia.**—*Brit. Med. Jl.* 1917. July 14 & 21. pp. 33–37; 75–79.

The author, a Major in the R.A.M.C. (T.), landed in Basra in April 1916 and set down his notes at the end of December so that his experience was of the dry weather and not of the rains. The characters of the weather were—sunny days with average temperature of 100°, usually not even a breeze (the Shamal having failed), diurnal range of temperature often remarkable, once as much as 47°, October-December nights cold. Temperature records are given, but not wet and dry bulb. The most trying experiencewas the moist heat of Basra in May and June, when perspiration "literally poured from one." Low blood pressure found to prevail was put down to this; in a small series of observations the average was 87½ mm. of mercury. Between 2 and 3 o'clock the temperature was highest and cases of abnormal pyrexia would occur in the wards. Large quantities of fluid were taken; the author never drank less than a gallon a day. The Indians felt the heat very much, the reason being that they were under canvas. The author found however he could work on the hottest days.

Insects. Insect bites were distressing owing to their liability to become infected, often leading to "grave disability extending into weeks or months." The European troops were not infected with lice, which the author attributes to the men being lightly clad and the hot sun, but "all through the hot weather body lice were very common among the native troops" [which suggests that Major Turner's explanation may not be the correct one]. In one of the camps fleas were a great nuisance. Sand-flies were very troublesome and the loss of sleep occasioned caused much depression. Nearly all the medical personnel had phlebotomus fever, "an irritable temper during convalescence being pathognomonic." An unknown insect produced large oedematous areas with recurrent irritation; the desire to scratch was almost irrepressible and the skin was easily broken with consequent sepsis. "The minor sepsis met with in this country is of a very resistant sort." Fatal septicaemia was seen as a complication of an apparently trivial sore. A mild and chronic form of pyaemia was quite common, with ultimate recovery; a persisting blood infection was believed to be "the cause of the various unexplained cases of spontaneous joint effusion met with." Leishman-Donovan bodies were found in sores from Amara. For cellulitis from infected bites the author recommends "a few applications of iodine to sterilize the surrounding skin, followed by a simple spirit dressing, great care being taken never to let the part remain uncovered."

Malaria. -Some of the cases were very severe. Gastric irritability with persistent vomiting was common, and in these cases the great value of intramuscular injections of quinine was demonstrated. Many so-called cases of heat stroke were really cerebral malaria.

Cholera was only sporadic, though all the creeks were polluted. Treatment by infusion of hypertonic saline was "attended with considerable success."

Enteric.—There were many cases of the enteric group, mostly paratyphoid A and B. Paratyphoid was often very severe. Perforation was rare though it was often diagnosed.

Scurvy.--Rarely were British patients sent to hospital with this diagnosis but cases occurred; they are classified in three groups:—(1) those in which scurvy is the explanation of some otherwise obscure haemorrhage; (2) those in which it explains the sluggish healing of some wound or ulcer; (3) those that occur in the course of some other illness for which the patient has been fed on sterilised foods. Examples are given of each group. The Indian troops suffered heavily. The actual symptoms are often preceded by conditions diagnosed as "debility."

Heat Stroke.--The author writes:—

> "I shall not soon forget the streams of patients in June and July who were hurried to the bath house, nor the occasion when nearly a dozen stertorous patients lay in the open air along the side of the creek, many of whom went to make up the sixteen funerals that left our hospital the next day. . . . Nearly every case illustrated the importance of prophylaxis and of early treatment."

Relapses were common. Autopsies showed little.

Jaundice.--Common in May and June. It was probably not of the epidemic type, and some cases were believed to be malarial. "Many different factors were probably at work."

Dysentery formed a large proportion of the medical cases; it was bacillary and to a less extent amoebic. In the former the effect of anti-dysenteric serum was often remarkable. The author saw over a dozen cases of liver abscess. Three were discovered post mortem;

others were only suspected and cleared up with emetine; seven required operation, the method being open incision and drainage through an intercostal space. Other complications were perforation of the colon and acute peritonitis without perforation.

Beriberi.– There were one or two cases. The author is "sure that the debility of active service is some type of nutritional disease probably allied both to scurvy and beriberi."

Other diseases described are *parotitis* which was very common at Amara in July. The author has notes of 23 cases, 16 of which were infections of the enteric group. *Gall bladder infections* were not uncommon, usually associated with enteric. Several cases of *renal colic* were attributed to excess of oxalate crystals in the urine.

The rest of the paper deals with the wounded, who during the time under review were few and did remarkably well, and with the specialities.

A. G. B.

MACGREGOR (Malcolm Evan). **A Summary of our Knowledge of Insect Vectors.**—*Jl. Trop. Med. & Hyg.* 1917. Sept. 15. Vol 20. No. 18. pp. 205–209.

Apart from the historical introduction the major part of this paper is occupied by six tables, giving the organism (when known), host, disease, and vector (known or suspected) for diseases of (1) unknown origin, (2) bacterial origin, (3) spirochaetal origin, (4) protozoal origin, (5) helminth origin and (6) diseases directly attributable to insects and acarines. These tables give full information in a small space and will doubtless prove useful. Two points are worth noting. The author gives *Bartonia bacilliformis x-bodies* as the cause of verruga transmitted by *Phlebotomus verrucarm* [sic]. STRONG and his colleagues were unable to demonstrate the virus of verruga and do not accept TOWNSEND's experiments; *Bartonella bacilliformis* they found to be the cause of Oroya fever which they showed to be distinct from verruga [see this *Bulletin*, Vol. 7, pp. 70–3]. To "*Culex* and *Anopheles* sps." as vectors of the embryos of *Filaria bancrofti* should be added, in view of the work of BAHR in Fiji, *Stegomyia*.

A. G. B.

PARROT (L.). **Sur un nouveau Phlébotome algérien** *Phlebotomus sergenti*, **sp. nov. (Note préliminaire.)**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 564–567. With 11 figs.

The new Phlebotomus, which was taken at Constantine, at 930 metres altitude, is described with figures. The female is unknown. Three species have been reported from Algeria, to wit *P. papatasii*, *P. minutus* var. *africanus* and *P. perniciosus*.

A. G. B.

COMMES (Ch.). **Les Méningites dans la région de Bamako (Soudan Français).**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 568–575. With 4 charts.

The author has not met with cerebro-spinal meningitis at Bamako, though it has been reported by administrators. In two months he saw 17 cases of meningitis, of which 13 were pneumococcal, 2 malarial, 1 tubercular and 1 of parasitic origin. A case of each is described with a chart. In every instance diagnosis was made by the aid of the microscope. Pneumococcal meningitis is so frequent and so fatal to the black race that, when a case is recognised, the hut the patient occupied is limewashed and his belongings are washed with 1–1,000 perchloride; the contacts are made to gargle hypochlorite of lime solution (30 parts per 1,000 of water). The two malarial cases had large spleens, a decided mononucleosis, and numerous *P. praecox*. The examination of the cerebro-spinal fluid showed nothing abnormal. The temperature curve and the effect of quinine revealed their nature. In the case described there was stiffness of the neck, intense headache, contraction of pupils, " chien de fusil " attitude, muscular contraction, Kernig's sign. In the case of toxic meningitis of parasitic origin examination of the blood showed eosinophilia (12·75 per cent.) and that of the faeces numerous ova of ascaris and ankylostomes. Thymol treatment was followed by recovery.

A. G. B.

SCHIMEONI-MECKLER (L.). **Ueber Stomatitis und Pharyngitis ulcerosa.** —*Arch. f. Schiffs- u. Trop.-Hyg.* 1917. June. Vol. 21. No. 11-12. pp. 205–209.

This paper, from a Turkish Military Hospital in Jerusalem, treats of an epidemic of 77 cases of stomatitis and ulcerating pharyngitis seen in the course of four weeks. Most of the patients came at an advanced stage but in one, in hospital for bronchitis, the development was watched from the start. A swelling appeared at the angle of the lower jaw, visible also in the mouth where, after four days, a pseudomembrane formed in which were demonstrated fusiform bacilli and spirochaetes. There was no rise of temperature and no special pain. The cases are grouped as ulcerative stomatitis (17 cases), ulcerative gingivitis (28 cases), mixed forms (27 cases), and angina or ulcerative pharyngitis (6 cases). Cases of the second group were first diagnosed as scurvy but the fusiform bacilli and spirochaetes were invariably found. The diagnosis has to be made from diphtheria, syphilis, and sporotrichosis, which has been met with in Palestine. Fusiform bacilli and spirochaetes were found in 74 of the 77 cases. The most useful treatment was by permanganate and tincture of iodine, applied with energy and fairly strong. Neosalvarsan was given with apparent success in three cases.

A. G. B.

FILHO (Arthur Moncorvo). **Os primeiros ensaios heliotherapia no Brazil.** [First Experiences with Heliotherapy in Brazil.]—*Brazil Medico.* 1917. Feb. 3 & 10; Mar. 3, 17 & 31; Apr. 7. Vol. 31. Nos. 5, 6, 9, 11, 13, 14. pp. 37–38; 44–46; 74–77; 91–93; 109–111; 116–118. With 19 figs.

Reports of a series of cases of disease in children treated with sunbaths, after the method advocated by ROLLIER of Leysin, in Switzerland. Of the 14 cases recorded all but one seem to have been of a tuberculous nature, and therefore rather outside the scope of this *Bulletin*. The remaining one (Case 3), however, seems to have been a case of anaesthetic leprosy in a child of 12 years, in which there was an ulcer on the outer side of the left foot. This healed completely as the result of a course of treatment extending over four months.

J. B. Nias.

COLYER (S.). **Heart Disease in African Natives.**—*S. African Med. Rec.* 1917. Aug. 11. Vol. 15. No. 15. pp. 232–234.

The figures given in this paper are based on the examination of 5,541 natives of Northern Rhodesia in respect of their suitability for work in a mine. After the exclusion of what were believed to be functional murmurs there remained 366 cases, or 6·7 per cent, of heart disease, but " the cases were examined in the open air and examination was often rapid, so no claim for great accuracy can be made." In the " vast majority " hypertrophy, conduction of sounds, and thrills, were associated with murmurs. Aortic regurgitation was not found. The lesions are classified thus :—

	No. of Cases.	Percentage of whole.
Mitral systolic	168	45·90
Pure presystolic mitral	122	33·33
Double mitral	51	13·93
Aortic systolic	16	4·37
Mitral and aortic systolic	5	1·36
Mitral and aortic systolic with presystolic mitral	2	·54
Tricuspid systolic	2	·54
	366	99·97

After the diagnosis had been made nearly all the recruits were submitted to an exercise test—a run of 75 yards down a hill with a fall of 10 feet, and back. Most bore the test extremely well and were passed for mine work. After a discussion of the effect of exercise on the various auscultatory signs the author discusses the aetiology. He has never seen a case of rheumatic fever in a native. He notes " in support of the possible rheumatic origin of these cases " that of 503 natives from certain villages on or near Bangweolu – a swampy region [as readers of Livingstone's last travels will remember] 139 or 27·6 per cent. " showed organic heart disease." He suggests as a possible avenue of infection oral sepsis ; in 1,000 successive examinations of natives only 4·3 per cent. had clean mouths, the rest suffering more or less from " pyorrhoea alveolaris," but this suggestion is an afterthought.

[It would be of interest to have an account of the cardiac condition of the women of these Northern Rhodesian natives.]

A. G. B.

WALKER (Ernest Linwood). **The Etiologic Agent and the Localizing Factor of the Abscesses in Myositis purulenta tropica.**—*Jl. Infect. Dis.* 1917. Sept. Vol. 21. No. 3. pp. 298–302.

An interesting discussion of these abscesses which are dealt with inadequately, if at all, in the text books. The author distinguishes between the aetiologic agent which incites the formation of pus and the localising factor which determines the seat in the muscles. He defines the disease as "characterised by the development of deep muscle abscesses in the limbs or trunk, associated with rheumatoid pains and tenderness in the affected muscles and an irregular febrile temperature. The parts most often affected are the great muscles of the extremities, especially of the thigh and calf, and the muscles of the trunk, abdomen and chest. The muscles of the face, neck and hands are said to be exempt. There is a great tendency to multiple abscesses, s veral developing simultaneously or successive crops of them appearing at intervals." The disease has been described from West Africa, New Guinea and the South Sea Islands, the Panama Canal Zone, British Guiana, and possible elsewhere, but there may be confusion with other pathological conditions. During a stay of five months in the Upper Madeira Valley, Brazil, the author saw four cases. There was no history or clinical evidence of filarial infection. The pus consisted of polymorphonuclear neutrophile leucocytes with no excess of eosinophiles. Staphylococci were found in all. The blood did not show eosinophilia, and thick blood smears made both by day and night were negative for filaria. The following reasons are given for the pyogenic cocci rather than filariae being the aetiologic agents :—

"1. The pyogenic cocci, as all authors agree, are usually found in the pus, and they are probably always present in the early stages of the abscess. The occasional absence of these organisms reported by Kulz, Ziemann, and Wise and Minett are probably due to the age of the abscess. It is well known that the pyogenic cocci frequently disappear in the later stages of suppurative processes.

"2. The pyogenic cocci found in these deep muscle abscesses cannot be secondary invaders in the ordinary sense because they can reach these locations only through the blood stream.

"3. The cellular reaction in these muscle abscesses is not characteristic of filarial infections. The cellular reactions to living filariae are fibrous tissue and eosinophiles (Bahr), and to dead filaria calcification (Wise, Bahr); while the cellular reaction in myositis purulenta tropica is polymorphonuclear neutrophiles, which is the characteristic reaction to the pyogenic cocci.

"4. From the prevalence of filarial infections in certain regions and the frequency with which dead and calcified filariae are found in the tissues at autopsy, it is evident that filariae of themselves are incapable of producing abscesses. On the other hand, the pyogenic cocci are capable of producing, and if localized in the muscles must inevitably produce, the total clinical and pathologic picture of myositis purulenta tropica."

After a discussion of the possible part played by filaria, though the disease appears to be absent from many filarial countries, the author concludes that it is a peculiar form of pyaemia, but that the localising factor is probably filarial.

[For previous papers on this subject see this *Bulletin,* Vol. 2, pp. 92 and 422 ; Vol. 3, pp. 281 and 317 ; Vol. 4, p. 130.]

A. G. B.

VIALA (Jules). **Les vaccinations antirabiques à l'Institut Pasteur en 1916.**—*Ann. Inst. Pasteur.* 1917. July. Vol. 31. No. 7. pp. 368–372.

For 1916 the corrected statistics are, treated, 1,388 ; died of rabies 3 ; mortality 0·21 per cent. A table giving the same data for each year since 1886 shows that the numbers treated, which for 1911–1914 were in the 300's, rose in 1916 to a level last reached in the year 1900. Another table shows that the three deaths were in persons bitten on the hands. The cases came from 64 Departments, evidence that rabies is generally distributed in France. Brief notes are given of the cases which died during and after treatment.

A. G. B.

PIJPER (A.). **Some Unusual Infections. IV.—Nocardia-Infection of the Bladder. V.—Cryptococcosis.**—*Med. Jl. S. Africa.* 1917. May. Vol. 12. No. 10. pp. 157–158.

The Nocardia, believed to be a new species, was grown from the urine in a case of cystitis. Epithelial cells from the bladder contained structures which suggested streptococci in a damaged condition. The microscopical appearances and cultural characters are briefly described. It was non-pathogenic for rabbits.

In the ballooned prepuce of a man with congenital phimosis and chronic cystitis a number of organisms were found, among them a yeast-like microbe which reproduced by budding. It was believed to be a Cryptococcus.

A. G. B.

CASTELLANI (Aldo). **Note sur la "broncho-spirochétose" et les "bronchites mycosiques." Affections simulant quelquefois la tuberculose pulmonaire.**—*Presse Med.* 1917. July 5. Vol. 25. No. 37. pp. 377–380. With 9 figs.

In a small military sanatorium in the Adriatic-Balkan Zone Castellani found in 1916 that more than three per cent. of soldiers supposed to be tubercular had bronchial spirochaetosis or, more frequently, bronchomycosis. It is the chronic form of broncho-spirochaetosis that may simulate pulmonary tuberculosis. It may follow one or more acute attacks or develop slowly with a cough and no other symptoms. There is muco-purulent sputum, sometimes containing blood, weakness, loss of flesh and often evening fever. Physical signs are absent or variable. It may last for years with periods of improvement or progress rapidly. The prognosis is bad if the right treatment is not applied, viz., arsenic and tartar emetic with either codeine or iodide of potassium and bicarbonate of soda [cf. this *Bulletin*, vol. 9, p 246].

The most frequent forms of bronchomycosis that the author has met with are bronchomoniliasis, broncho-oidosis and broncho-hemisporosis; the two first are so alike clinically that they are described together. Tables are given of the biochemical reaction of various species of Monilia and Oidium and those genera are discussed. As to the clinical symptoms, there is a benign and a malignant kind. There is cough and muco-purulent expectoration, and in the grave forms loss of flesh and evening fever. There may be areas of dullness and crepitations, or no physical signs. The duration is from some months to two or three years. The subacute and chronic forms are frequent in Ceylon among coolies who work in tea factories. The diagnosis is based on the results of the microscopic and cultural examination of the sputum. Treatment by iodides is useful but does not always prevent a fatal termination.

Broncho-hemisporosis is caused by *Hemispora rugosa* Castellani. Clinically it resembles broncho-moniliasis but it responds better to iodides.

The appearance of species of the three fungi is well shown in the figures.

A. G. B.

BLANCHARD (R.). **Monographie des Hémadipsines (Sangsues terrestres).**—*Bull. Soc. Path. Exot.* 1917. July. Vol. 10. No. 7. pp. 640–675. With 17 figs. & 1 plate.

The leeches classified and described in this monograph are the Haemadipsinae or terrestrial leeches with jaws, small leeches which lurk for men and other warm-blooded vertebrates in trees, shrubs or long grass and throw themselves upon him as he passes. Their victims bleed after the leeches have sucked their fill, the wounds are liable to become septic and it is possible that infective diseases are thus transmitted. The Haemadipsinae form one of the sub-families of the Gnathobdellidae, the type genus being *Haemadipsa* Tennent, 1861. The terrestrial leeches of tropical America have no jaws and belong to another family. The Haemadipsinae are defined as small terrestrial leeches, dentition simple and complete, normal somite variously constituted; from countries washed by the Indian and Pacific Oceans, to the exclusion of the African and American continents. One genus is found, however, in Chili and another in Austria. Five genera of the Haemadipsinae are distinguished: *Mesobdella*, *Philaemon*, *Phytobdella*, *Planobdella*, all described by the author (Philaemon for the first time here), and *Haemadipsa*; each has a different number of rings in the normal somite.

The major part of the monograph is occupied by a description of species of the five genera. *Haemadipsa zeylanica* Moquin-Tandon is very widely spread; extracts from old authors illustrate how serious a pest leeches of this species are.* The author notes that the specimens in collections are much shrunken, and better prepared ones are wanted. The simplest plan is to pour boiling water on the living animals; they contract, relax, and die in extension. They are promptly placed in fixatives or alcohol. The monograph concludes with a list of references and a plate of illustrations of *Haemadipsa zeylanica*, to show the variations in pigmentation.

A. G. B.

CRAIGEN (A. J.). **Puerperal Eclampsia or Toxaemia of Later Pregnancy in British Guiana.**—*Brit. Guiana Med. Ann. for 1915.* [1916.] Demerara: The Argosy Co. Ltd., Georgetown. pp. 1–6.

English returns give the incidence of this disease as about 1 in 500 deliveries. The maternity records of the Public Hospital, Georgetown, which go back 30 years, show that there have been 10,256 deliveries with 254 cases of eclampsia, or an average of 1 in 44·7 deliveries; *i.e.*, eclampsia is about ten times as frequent in British Guiana as in England. This is attributed to "the large number of cases suffering from albuminuria and the poor general state of health of the expectant mother due no doubt to the malarious climate associated with social and economic conditions and a high illegitimate rate." Albuminuria is very prevalent among these women, and the last six years' records show that in from 10·4 to 14·8 per cent. of cases the urine was loaded with albumin. In the same period of 93 cases of eclampsia 77 had albumin loaded. The death-rate from eclampsia in England is 20–25 per cent. At Georgetown for the years 1910–1915 it averaged 38·7 per cent., but in the last year dropped to 18·1; this is attributed to the use of Veratrone. Out of the last 32 cases treated with this drug only 3, or 10 per cent., have died. Veratrone is a preparation of Parke, Davis & Co.; it contains the active principle of *Veratrum viride* and is given hypodermically.

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* See also ALLBUTT and ROLLESTON'S System of Medicine, Vol. 2, Part 2, p. 960.

A. G. B.

GUERRERO (Luis E.), DE LA PAZ (D.) & GUERRERO (Alfredo L.). **Poisoning by** *Illicium religiosum* **Siebold.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1916. Sept. Vol. 11. No. 5. pp. 203-213.

The authors say that poisoning from the use of certain plants in the Philippines is by no means so rare as one would be led to expect after consulting the literature. They know of cases of poisoning by species of Dioscorea, Jatropha, Anamirta, Strychnos and Datura. Recently they have seen four cases from the use of a decoction of *sanki*, the fruit of *Illicium religiosum* Siebold, given as a stimulant. These cases are described. This fruit is not used as a condiment nor as a medicine but another species, *I. anisatum*, is so used, and the former being cheaper is often substituted for the latter. The Chinese consider both species poisonous. The authors' experiments show that *I. religiosum* is 14 times more toxic than its congener when kittens are used. *I. religiosum* is the only variety that is sold in the groceries of Manila. MONTEL has described three cases of poisoning from Cochin China; these are related. Other cases have been reported from Japan. The following symptoms may occur: –

> "Foaming at the mouth, repeated vomiting, diarrhoea, thirst, unconsciousness, clonic and tonic convulsions, cramps in the legs, cephalalgia, mental disturbances, insomnia, profuse sweating, oliguria or anuria, large strong pulse giving place to small rapid pulse, cold extremities, contracted or dilated pupils, paresis of the lower limbs, and exhaustion. The vomitus may be streaked with blood. During the convulsions the pupils as a rule dilate, the eyeballs bulge, the head is retracted toward the back, the respiration stops, and the face is cyanotic."

Cholera, strychnine poisoning, tetanus, and perhaps cerebrospinal meningitis have to be considered in the diagnosis; the authors' first case was believed to be cholera. The identification of the fruit is discussed at length. The active principle has not yet been isolated with certainty. Treatment is by apomorphine, the convulsions being controlled by inhalation of ether and administration of chloral and bromides, suspended when paralysis sets in, in which case the vital centres and eliminatory organs must be kept going.

[*Illicium religiosum* Zieb. and Zucc. is figured by BOYÉ in GRALL and CLARAC'S "Traité Pratique de Pathologie Exotique." It resembles *I. anisatum*, which is the star anise, an evergreen magnoliaceous tree common round Japanese temples and cemeteries; both species are known in China and Japan as "badiane."]

A. G. B.

KILGORE (A. R.) & LIU (J. H.). **Emetin Diarrhea—Clinical and Experimental.**—*Arch. Intern. Med.* 1917. Aug. 15. Vol. 20. No. 2. pp. 178–183. With 2 coloured plates.

Notes are given of three cases of bloody diarrhoea in children in China, in one of which amoebae were found. They were treated with emetine and after a period of improvement blood and mucus were again frequently passed. The emetin was omitted and the symptoms ceased. In one instance, a boy of 10, seven grains had been given in six days.

The experiments were made on 13 dogs, two of which were controls. They received emetine subcutaneously till definite symptoms appeared. Nine had bloody stools. Autopsies showed haemorrhagic gastroenteritis with haemorrhages in the lymph glands, spleen, kidneys, and thymus. Reference is made to LEVY and ROWNTREE'S paper [see this *Bulletin*, Vol. 8, p. 218.]

A. G. B.

i. LARIMORE (Joseph W.). **Emetine Hydrochlorid: A Note concerning its Intravenous Administration.**—*Southern Med. Jl.* 1917. Aug. Vol. 10. No. 8. pp. 633–635.

ii. FIGDOR (P.). **The Administration of Emetine.** [Correspondence.] —*Lancet.* 1917. Aug. 18. p. 258.

i. The author used emetine intravenously in the treatment of amoebic dysentery, one grain at each injection. The injections are given quickly in one mil of fluid. Brief notes are given on 11 cases so treated; the maximum number of injections was 14. He believes that by the intravenous way a more adequate concentration of the drug is obtained in the circulation.

ii. This author advises intramuscular rather than subcutaneous inoculation on the grounds that it causes less pain, at the time and afterwards and no tenderness or swelling, that its efficacy may be increased through more rapid absorption, and the same site of inoculation may be used repeatedly.

A. G. B.

BOOK REVIEWS.

HOWARD (Leland O.), DYAR (Harrison G.) & KNAB (Frederick). **The Mosquitoes of North and Central America and West Indies.** Vol. 4. Systematic Description. (In Two Parts). Part 2. pp. 525–1064. —1917. Washington, D.C.: Carnegie Institute.

Some attempt has been made already in this *Bulletin* [Vol. 8, pp. 68–71] to appraise the value of this fine and comprehensive monograph—now, by the publication of the fourth volume, happily completed—and particularly to estimate its importance as a work of reference to all who have to deal with mosquitoes in their pathogenic and anti-sanitary aspects, so that it is enough to say of the general character of this final instalment—which includes, among other things, the invidious Anopheline group—*finis coronat opus.*

As the scheme of classification matured by the authors is remarkable in its freedom from mystery, and in the uniform precision of its definitions, one has no hesitation in reviewing it in some detail, since there is good reason to fear that a haphazard multiplication of hazy and incoherent genera has for some time disinclined the generality of medical men from the serious study of *Culicidae.*

The authors, then, distribute the *Culicidae* in three sub-families—*Dixinae, Corethrinae,* and *Culicinae,* each defined by adult and complementary larval characters. The *Dixinae* have no economic significance, and the *Corethrinae* have merely an indirect interest by reason of their predatory larvae, which feed largely on the larvae of other mosquitoes, capturing their prey with their distinctive raptorial antennae and not with mouth-brushes.

The *Culicinae,* or true mosquitoes, with mouth-organs adapted in the female for piercing, are divided into two tribes—*Sabethini* and *Culicini,* the latter containing a large majority of the species.

The *Sabethini,* which are almost exclusively tropical in their range, are differentiated as adults by numerous characters, positive and negative, of which the most constant combination is the presence of a pair of large proclivous occipital bristles, and of a tuft of bristles upon the metanotum, and the absence of secondary enlarged bristles from the field or "disk" (though not from the edge) of the mesonotum. The larvae are distinguished mainly by the lack of a *median* brush of hairs from the sternum of the terminal segment (though there may be one or two pair of *lateral* bristles on this segment), by the numerous stellate tufts of bristles on both dorsal and ventral surface, and by their pale yellow colour. The pupae, which also are pale yellow, are recognisable by the small size of the terminal paddles, and by the great development of the plumes of hairs at the lateral angles of the 7th and 8th abdominal segments. The Sabethines generally deposit their eggs on the leaves of plants, and the larvae as a rule are found only in the water that collects at the base or in the ensheathing parts of leaves and flowers. The adults are sylvan, and they hold their hind legs in a characteristic pose—uplifted and directed forwards. From the "medical" standpoint they are not known to be of any importance.

The *Culicini,* as here defined, rarely have the bristles of the vertex of the head concentrated as a single conspicuous pair, rarely have any bristles on the metanotum, and usually have rows of secondary bristles on the field of the mesonotum, as well as marginal bristles. The larvae have a median brush of hairs on the terminal segment, and in the pupae the terminal paddles are large, and the tufts of bristles at the lateral angles of the 7th and 8th abdominal segments are insignificant.

The authors separate the *Culicini* in four stocks typified severally by *Dinocerites, Culex, Megarhinus,* and *Anopheles.*

The *Dinocerites* stock are "crab-hole mosquitoes" (though not the only mosquitoes that frequent and breed their offspring in the burrows of crabs), and are restricted to the marine littoral of Tropical America. They have short palpi in both sexes, but the main distinctive feature is the great length and tenuity of the antennae; this, however, as the authors allow, is probably an adaptive character, so that on the whole one is inclined to demur to the separation of *Dinocerites* from the *Culex* stock with which it otherwise agrees so closely. Though some writers have accused these mosquitoes of biting, the authors do not think that they are likely to annoy man.

The *Megarhinus* stock forms a single genus characterised by the rigid, tapering, decurved proboscis, and also noteworthy for the brilliant metallic colouring, and for the large individual size. The larvae, so far as is known, live in much the same situations as the Sabethines and are exclusively predatory. The authors confirm the statement that these mosquitoes do not—and, from the nature of their proboscis, probably can not—bite.

One of the most admirable achievements of this latest classification is the clarifying of the *Culex* stock, and here the only matter for regret is that the authors' survey is limited to America. In this great area the number of genera admitted to the *Culex* alliance is reduced to eleven, all of which are reconstructed and broadly defined on characters that take into account both the sexes as well as the larval phases; these genera are *Culex*, *Carrollia*, *Lutzia*, *Culiseta*, *Mansonia*, *Psorophora*, *Aëdes*, *Haemagogus*, *Orthopodomyia*, *Uranotaenia*, and *Aëdomyia*.

The genus *Culex*, as here reformed, includes all the Culicini with trilobate scutellum, glabrous metanotum, and normal antennae and proboscis, that possess in addition the following adult characters: female abdomen with truncated tip and coarse retractile cerci, female claws equal and simple, palpi short in the female and generally (but not always) long and acuminate in the male, male genitalia with harpes and short harpagones, cross-veins of wings normal, hind tibial scraper with few or no teeth. In the larva the antennae are large with a very conspicuous brush of hairs in the distal half on the inner side, the breathing-tube is long with several distant wisps or single hairs and a double pecten, and there is a considerable patch of scales on the sides of the 8th abdominal segment. The eggs are laid in rafts, on water, and they usually hatch quickly. In this reconstituted genus *Culex* nearly thirty of the "Culicine genera" proposed by other writers are compacted.

Carrollia and *Lutzia* might, the authors think, be regarded as subgenera of Culex: *Carrollia* differs chiefly in having the abdomen laterally compressed, *Lutzia* in the large size of the empodia.

Culiseta (= *Theobaldia*, etc.) differs from Culex principally in having the cross-veins of the wings so approximated as to lie very nearly in a line, in the numerous spines of the hind tibial scraper, and in the club-shaped male palpi.

In their definition of the genus *Mansonia* the authors disregard the broad diversely-coloured wing-scales, and seem to ignore the remarkable comb of spines on the 8th tergum of the blunt-ended Culex-like female abdomen; they emphasize as generic differentiae the numerous teeth of the hind tibial scraper, the longish female palpi, and the long rod-like process of the inner angle of the side-piece of the male genitalia. The larvae, which have large antennae of an exaggerated Culex type, are remarkable for their habits and for the corresponding adaptations of the breathing-tube; they live among the rootlets of aquatic plants, and the breathing-tube ends in a beak for penetrating the tissue of the rootlets and tapping their supplies of ox

he genus *Aëdomyia*, which has wing-scales like *Mansonia* and also a larva of the same habits and structural modifications as *Mansonia*, the authors isolate by reason of the antennae, which have short and broad segments, and the male genitalia, which have no harpes. In this last character, as well as in the single spermatheca of the female, there are resemblances to the *Anopheles* stock which apparently have not impressed the authors

The genus *Orthopodomyia* (= *Bancroftia*, and *Finlaya* in part) which like all the preceding has in the female a blunt-tipped abdomen and simple claws, also has a superficial resemblance to *Mansonia* by reason of its broad and often mottled wing-scales. As quite distinctive characters the authors draw attention to the front legs, in which the 4th tarsal segment is much shorter than the 5th, and to the different male genitalia; furthermore, the larva, which is strongly pigmented with crimson, has the antennal brush placed far back. The eggs, so far as is known, are laid in holes of trees, and the larvae are found in the water that collects in such places.

The genus *Aëdes* has been radically reformed, and here comprises more than fifty of the "Culicine genera" precariously established in recent years. As now re-organised and defined it includes the great majority of the species of the Culex stock in the females of which the abdomen tapers to a point and ends in two slender exserted cerci and the claws of the legs usually have an extra tooth. The scraper of the hind tibiae consists of numerous spines; the palpi are short in the female and generally long (though sometimes short, as in MEIGEN's original type) in the male; and in the male genitalia the harpagones have a single terminal appendage. The *Aëdes* larva has small antennae, with the sub-median hair-tuft on the inner edge small or even reduced to a hair or two; and a short or shortish breathing-tube, with a single pair of ventral tufts and a basal pecten. The eggs are laid singly, not so much in water as in places where water is likely to collect, and they often remain dormant for a long season. The adults are rarely found in houses, some of the species of "Stegomyia" (which is one of the fragments of the nebulous agglomeration now condensed into *Aëdes*) being notorious exceptions.

The genera *Psorophora* (= also *Janthinosoma* and portions of other doubtful genera) and *Haemogogus*, both of which are restricted to America, are closely related to *Aëdes* and have the same tapering female abdomen. In *Psorophora* the 8th abdominal segment is completely retractile in the female; and *Haemagogus* is peculiarly distinguished by the large approximated thoracic lobes; the species of both genera breed in hollows and similar places where water collects after rain.

The last genus of the Culex stock represented in America, *Uranotaenia*, is considered by the authors to have leanings towards *Anopheles*, the larva having among other Anopheline features an elongate head with prominent clypeus, and also much the same pose in the water. In both sexes the palpi are short and the claws simple, and in the male the claws of the middle legs are remarkably unequal; another characteristic feature, suggesting affinity with the *Megarhinus* stock, is the shortness of the fork cells (2nd marginal and 2nd posterior) of the wings. As in *Anopheles* and *Aedomyia* the male genitalia are devoid of harpes. The eggs are laid in rafts, usually in permanent water. The authors hazard the suggestion that the New Guinean form *Bironella*, uncertainly referred by THEOBALD to the Anopheles alliance, may be a *Uranotaenia*.

In the *Anopheles* alliance the authors reduce all the known species to two genera, *Anopheles* and *Coelodiazesis* *Coelodiazesis* includes a few species found in various parts of the Northern Temperate Zone—species with unspotted wings, in which the mesonotum is less elongate and more convex than normal; the larvae, which are met with only in water accumulated in hollow trees, have the large lateral feathers on the first *six* abdominal segments, instead of being restricted to the first three. All other Anophelines but these—all the "Anopheline genera" of authors—are comprised in *Anopheles*, and in the differentiation of the American species the authors rely mainly on colour markings and to some extent on distribution and shape of scales. Twenty-one species are admitted in the area specified, but the distinctions made between some of the Neotropical species are not always easy to appreciate. So far as they are able the authors describe the habitat, and even the particular haunts, of the larvae, which in some species, it is very important to notice, are restricted to water caught in the imbricating leaves of Bromeliaceous plants.

To conclude this abstract of the authors' classification of the *Culicidae*, the only point that is unlikely to command lasting assent is the position accorded to the Anophelines as a mere section of a tribe, *Culicini*, the entirety of which is no more than equal in taxonomic status to the *Sabethini*. The authors, with good reason, adjudge the *Anopheles* stock to be of all true mosquitoes the "lowest," that is to say probably the least divergent from the assumed genetic type of the subfamily; they notice that in several points, particularly in the simplicity of the male genitalia, the Anophelines approximate to the *Corethrinae*; that in some larval features, particularly the breathing-mechanism, they exhibit affinities with the *Dixinae* and also that the elongate palpi common to both sexes is a very general Nematocerous possession. But these assumptions and inferences harmonize better with the views of those who would acknowledge the Anophelines as an ancient tribe equal in taxonomic dignity to all the other Culicinae—Sabethines, Megarhinines, Culicines, and Dinoceratines—combined, than they do with the conclusions drawn by our authors.

Speculations of this sort, however, are more than ever of the "stuff that dreams are made on"; the great achievement of the authors—from the purely practical standpoint of the medical entomologist whose interests are our particular concern here—is that they have not only given us a complete and harmonious account of the mosquitoes of North and Middle America as living insects, but have also shown generally that the specific identification of mosquitoes is everywhere a straightforward business unattended by any peculiar difficulties.

A. Alcock.

Mayer (T. F. G.), [M R.C.S., Eng., L.R.C.P., Lond. (Senior M. O. Sierra Leone).] **Formulary of Certain Drugs used in the Surgical Treatment of Tropical Diseases.**- 91 + xiii pp. 1917. Freetown: Government Printing Office. [Price not stated.]

Workers in Tropical Medicine and especially those whose duties carry them far from the haunts of man, will find the little manual on the formulary of certain drugs by Dr. Mayer of very great value. Why the title, Surgical treatment of tropical diseases? The Physician will rise in arms, one fears, when he hears that the treatment of dysentery by mouth drugs is to be relegated to the domain of Surgery. Incidentally, the emetine hydrochloride treatment by the needle is quite out of date now and beginners following out such instructions will only be perpetuating the errors of the past and, what is much more important, will not cure their patients. The dose one notices is given as ½ 4 grains; the latter is too big, and in certain cases the results might even be serious.

Keratin coated tabloids are recommended for the new emetine bismuth iodide. The loose powder in an ordinary gelatine capsule is the best form in which to administer this preparation as the keratin tabloid may pass unchanged Haffkine's name, p. 43 is mispelt. Times change so quickly now that it is extremely difficult for anyone, even at home in London, to keep up to date, and one must not be too hard on Dr. Mayer far away on the West Coast of Africa. The idea of the book is a good one and in future editions it can be brought up to date and more useful details added. Thymol, which is dealt with in two lines, should have a page if not two devoted to it and other drugs might easily find a place.

G. C. Low.

TROPICAL DISEASES BUREAU.

TROPICAL DISEASES BULLETIN.

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APPLIED HYGIENE IN THE TROPICS.

By Colonel W. G. King, C.I.E., I.M.S. (Retired).

REPORTS.

Gold Coast (1916).

The Medical and Sanitary Report of the Gold Coast for 1916, by Dr. Alexander, shows that of 589 European officials resident, the death-rate was 6·70 per mille against 14·3 in 1914, in a population of 768. The invaliding rate in the larger population of 1914 was 3·7 against 5·15 per cent. As the Report records no marked sanitary improvements in the lapse of two years, the moral would seem to be that prompt invaliding has a special value in saving life; provided that the record debits deaths to local strength, in the case of officials invalided. Amongst native officials in a strength of 1,709, the death-rate was 5·5 per mille. In a total of 48,155 in and out-patients treated, there were recognised 23 cases of bilharziasis, 506 Dracunculus, 283 tuberculosis, 8 trypanosomiasis, 221 syphilis, 464 yaws, 20 nodular and 1 anaesthetic form of leprosy, 6 of enteric fever; of malarial fevers 837 tertian, 28 quartan, 595 aestivo-autumnal--16 blackwater, 351 pneumonia, 9 amoebic dysentery, 527 of other forms of dysentery, and 6 of yellow fever. In the prisons, in a total population of 6,169 (the daily average strength not stated) the favourable death-rate of 4·2 per mille was obtained.

Somaliland (1916.)

Dr. F. E. Whitehead, Temporary Senior Medical Officer, Somaliland Protectorate, in his Annual Report for 1916 states that whilst a large number of fevers have been under treatment, so many patients merely take a dose of medicine and do not again make an appearance that at times it is not possible to secure an accurate diagnosis. Malarial fevers are probably not largely prevalent; thus of ninety cases of fever where microscopical examination was employed only three were proved to be malaria. Relapsing fever is very common in the district of Hargeisa where the *Ornithodorus moubata* tick is found.

> "It would appear that the habitual residents in this part acquire a certain amount of immunity to the fever; the attacks in their cases do not seem to be so severe as in new-comers, although the blood of the former

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> who may not appear very ill, may be swarming with spirochaetes, whilst in the latter, who may be severely ill, the spirochaetes are only found with difficulty sometimes. Steps have been taken to try and reduce the incidence of relapsing fever. Those that have the fever are treated with some success with atoxyl, but it is unfortunate that salvarsan or some similar preparation cannot be obtained at the present time."

Undulant fever exists though probably not extensively. The following paragraph of the Report conveys facts of both sanitary and political interest.

> "At an outlying Illalo post (irregulars), out of 40 men three had died from, and 19 were suffering from symptoms of malignant malarial fever. There is a permanent water supply at this post "El Dur Elan" which these men had to guard. These Illalos report that mosquitoes are numerous, and believe them to be the cause of this sickness. The disease has not yet been diagnosed microscopically, nor the type of mosquito prevalent in this district investigated, but this will be done if an opportunity arises. The post has been removed as far as possible from the water. No fresh cases have since been reported. Reports have lately been brought in by Dervish prisoners that at Tale, the stronghold of the Mullah, there have been many deaths amongst his followers. These prisoners state that the people were dying so quickly that the bodies were left in heaps and not buried. It is almost certain that the statement is exaggerated. As far as can be gathered, the symptoms point to a severe type of dysentery; the natives call it cholera. There have only been a few cases of spirillum fever amongst the troops during the last year, due mainly to the fact that men were not allowed to visit the 'coffee shops' in the town at night."

BASUTOLAND (1915–16).

The Medical and Sanitary Report for Basutoland for the year 1915–16 written by Dr. E. C. LONG, Principal Medical Officer, affords an epitome of excellent medical and surgical work. The Hospitals and Dispensaries of that area are apparently worked upon the understanding that the candidate for treatment should pay a fee. In 1915, the fee for out-patients was raised from sixpence to one shilling per head. In that year, £1,496 was realized in the six Hospitals and Dispensaries. The doubling of the fee did not however act as a serious deterrent as, in 1916, £1,635 was realized. The opinion is expressed that the extra charge has wrought a beneficial change in that with a less mass of patients to attend, more careful prescribing has been possible.

Whether a State should afford gratuitous treatment or not, or to what extent, is always a fine point for consideration in reference to local circumstances in imperfectly developed countries and there are necessarily pros and cons, but in this instance it is evident that the attendance was worth paying for. Dr. Long is able to record figures that show that the Basuto appreciates British surgery. Of laparotomies he records a list of 300 cases, all of which are fairly classed under "major operations."

When however the sanitary circumstances of Basutoland are looked for, the information placed at disposal is meagre. The contrast illustrates a fact well recognized by the profession that there is a point at which the medical man in the tropics cannot combine in his person both sanitary and medical duties over a large area; his energies must develop either the medical and surgical or the sanitary requirements of the area in his charge; or, in attempting the three branches, he risks in all mediocre results. If however the Basutoland Report has little to say of sanitary advance, it has the advantage of being able to record two important results of prophylaxis. Australia has been to the front in offering anti-typhoid inoculation to general populations, but Basutoland can record (unfortunately without figures in support or information as to concomitant sanitary efforts) the free use of the method and its excellent results. Thus Dr. Long states :—

> "Enteric fever has been less evident; this is partly due to the introduction of anti-typhoid vaccination which has been pretty general in the camps, and has been carried out also as far as possible in the districts. The Maseru reserve was practically free from enteric during last season, the whole population having been inoculated."

An illustration of the immense financial importance of sanitary supervision of labour is also placed on record by Dr. Long :—

> "Very few cases of miners' phthisis were observed. The health of the natives returning from the Gold Fields has been excellent.
>
> "The improvement in preventive measures in the Mine Compounds and the greater care of the general health of the natives employed there is undoubtedly exemplified in the almost total absence of serious illness in natives who have arrived thence in Basutoland."

NORTH BORNEO (1915).

Dr. W. B. ORME, Principal Medical Officer, State of North Borneo, in his Medical Report for 1915 [received during the current year] produces interesting evidence that in the distant territory of which he has medical and sanitary charge, there is no lack of continuous effort to maintain the life-saving principles of Tropical Hygiene.

Approximately the population dealt with amounts to 218,217. Registration of births and deaths is not yet conducted with sufficient accuracy for it to be possible to deduce any reliable vital statistics. So far, were the registration agency relied upon, there would be reason to fear the early extinction of the population—the deaths in 1915 exceeding the births by 702. Dr. Orme therefore finds it necessary to state that "in the opinion of the majority of our Registrars births are far less accurately reported than deaths. . . . for the reason that a permit is essential for a burial."

Evidently much care is exercised in urging the attention of the Managers of the numerous estates to the vital necessity of guarding the health of their employees in their own financial as well as in public interests. Figures are quoted showing the death rates of the estates; they vary greatly in respective localities; thus, whilst seven estates exhibit a rate below 10 per mille, on one the death rate is 43 per mille, whilst on another it is 72 per mille. In regard to the latter case, Dr. Orme remarks that, although the Manager had agreed that the Medical Officer concerned should visit the estate twice a month, it was ascertained that "in full five months only three visits were paid instead of ten arranged for, and as a consequence the percentage of deaths has risen to 7·29 per cent. which does not reflect to the Company's credit." Lest it be thought that the rate of mortality in North Borneo is phenomenal, it is well to remember that the total numbers of employees in each estate is usually well below 500, and that a few deaths beyond a normal rate render results appalling.

Much attention was paid during the year to vaccination. Vaccine was imported from Hongkong, and the following arrangement was made to secure its vitality during transit inland :—"Our plan of establishing ice depots at central stations and distributing the lymph

in thermos flasks, packed with broken ice, has, I venture to maintain, solved the problem as to how to vaccinate native populations at great distance from the lymph base."

Dr. Orme enters [p. 13] very fully into the important subject of dysentery in jails, and after pointing out that the careful administration of emetine does not infallibly prevent a patient becoming a "carrier" comes to the following conclusion :—

> "Instances of this kind shatter one's ambition for a clean and healthy gaol and leave open one method only for the sanitary protection of the inmates, viz., the isolation, disinfection and observation of all newcomers in a separate building for one week before allowing them to mingle with the older inmates."

Not an appeal to abstract theories but a *demonstration* of material facts is indubitably the correct and quickest way of educating the average uneducated classes of the tropics as to the benefit of the "kultur" of British Medicine and Hygiene. The following simple and matter of fact prodecure Dr. Orme considers meets these ends :—

> "In the hospitals of Sandakan and Jesselton the faeces after each treatment are collected and with the addition of water passed through the meshes of a fine sieve. By this means the patients have an opportunity of seeing the actual worms which the treatment has brought away."

On the subject of malaria prevention, Dr. Orme makes the following suggestions :—

> "Dr. C. Strickland, travelling Entomologist to the F. M. S. Government, has however made a great discovery, and finds that although in Selangor *Umbrosus* is found in quantities in the ravines, yet in Pahang it was practically absent. This work appears to indicate that ravines should be dealt with in two ways, by complete clearing and subsoil drainage where *Umbrosus* is plentiful and by leaving a broad strip of jungle at the bottom of the ravines where *Umbrosus* is absent."

MONTSERRAT (1916).

The Annual Medical Report for Montserrat shows that during 1916 the birth rate was 29·86 and the death rate 17·83.

During the year, besides an effort to attack ankylostomiasis a special campaign was made to eradicate yaws. Galyl, arsenobenzol and kharsivan were employed, the least effective being the first named.

The Report suggests that crab-pox is merely a late stage of yaws and is infective. Both ordinarily yielded to a single dose of salvarsan. A total of 335 cases was treated with intramuscular injections, nearly all in public dispensaries "and sent home at once."

> "No deaths followed. As a general result of this treatment, one may say that there has been a great improvement. Very few cases of early eruption of yaws are to be seen now, though there are still many cases of 'Crab Pox.' Cases are however likely to crop up, and an ample supply of salvarsan should be available for the next two or three years in order to continue the attempt to eradicate this loathsome disease."

EPIDEMIC JAUNDICE, SEYCHELLES.

Both the Chief Medical Officer and the Assistant Medical Officer in the Annual Medical Report, Seychelles, for the year 1916 draw attention to the existence of widespread epidemic jaundice. It is held to be distinctly infective.

The Assistant Medical Officer gives an analysis of the ages of 35 cases, in which he points to apparent preference for young females. He further states :—

"The infection was strange; my own house boy had the disease, and served the table during the interval, only one other boy took the disease from him, in some households several members were attacked one after another, while in another group one member of the family was attacked, the others escaping. No precautions against the spread of the disease were taken. I had the idea that it was due to some article of food imported into the colony. I have read the articles on jaundice that occurred in the Dardanelles and France; there were certain points of resemblance, but in none of the reports did I remark that as soon as the jaundice appeared the patient commenced to get better.

"It took the disease two months to arrive at Grande Police about seven miles from Anse Royale. I remarked that it followed the coast line, and that no cases came from families living in the highlands of the interior."

ZANZIBAR MOSQUITO FAUNA.

The following extract (from the portion edited by the Veterinary Zoologist, W. M. ADERS) of the Medical and Public Health Reports for the Zanzibar Protectorate for 1915 (p. 48) affords a concise statement of the mosquito fauna in Zanzibar, with reference to filariasis and malaria* :—

"*Stegomyia sugens*, Wied.—Has been taken on one occasion only in the town, breeding in a garden puddle. Several lots of larvae have been brought in from various out districts.

"The following mosquitoes have been taken in the town during 1915 :—

"*Stegomyia fasciata.*—Abundant everywhere.

"*Stegomyia sugens* —A rare form.

"*Culex fatigans.*—Abundant everywhere especially in cess-pools and water rich in decaying vegetation. Seldom taken in conjunction with *Stegomyia fasciata.*

"*Anopheles costalis.*—The only anopheline captured in the town. Nearly always found in large shallow collections of water such as garden tanks, puddles in gardens, and on one occasion they were found breeding in a canoe. Generally only taken during the rains and for a short time afterwards.

"*Culex tigripes.*—An occasional visitor. One could wish that this useful species was commoner. The larvae are extremely rapacious devouring large numbers of *Stegomyia fasciata* and *Culex fatigans.*

"*Eretmopodites quinquevittatus.*—Is becoming quite a common form, as mentioned before, generally found breeding in old snail shells.

"*Toxorhynchites brevipalpis.*—This mosquito has proved to be very ubiquitous, nearly every mango tree containing holes harbouring from 3 to 8 larvae.

"As mentioned in my former report in captivity they are predacious on larvae of *A. costalis, S. fasciata,* and *C. fatigans.* On no occasion have I found these larvae under natural conditions in association with *Toxorhynchites brevipalpis,* therefore from a beneficial point of view they are not of much value.

"The following breeding experiments were undertaken with *Toxorhynchites brevipalpis* :—

'Females could not be induced to feed on human blood, but partook greedily of banana and date. One female (bred) laid 31 eggs singly. . . . I have seen adult larvae devour 10 full grown *C. fatigans* larvae in an hour, besides killing a number of others. Generally speaking with a generous food supply, the larval stage lasts from 10 to 12 days. Pupal stage 3 days."

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* Zanzibar Protectorate. Medical and Public Health Reports for the Year 1915. 1916. Zanzibar: Printed by the Government Printer. p. 48.

In the portion of the Report edited by Dr. A. G. Carment, the Medical Officer of Health, the following references to filariasis and malaria are made* :—

> "From the special report on Filariasis, it will be seen that this disease is very widespread.
>
> "It is only to be expected that this would be so, as every native hut in the native town of Ngambo has its open cesspit inside.
>
> "An encouraging fact is the large drop in the malarial death rate in the town, a decrease of over a third from that of the previous year, this being evidence of good work accomplished by the Chief Sanitary Inspector and his Mosquito Brigade. The deaths from Malaria numbered 92 as against 145 for 1914."

THE ORIENTAL AND THE DRUG HABIT.

The Excise Department of the Government of Burma has normally a busy time in aiding official efforts to mitigate the tendency of Burmans, and of the numerous and various classes of Orientals to be found in Lower Burma, to adopt the drug taking habit. Necessarily, many samples of drugs must be formally identified chemically before legal prosecution for smuggling can proceed. Hence, to the Chemical Examiner of that Government falls the identification of numerous samples. The Report of this officer for 1916† contrasts results under this head between the year before the war and 1916 :—

	1913.	1916.
Cocaine	34,366	8,495
Morphia	6,853	2,829
Opium	1,847	3,319
Ganja [Cannabis indica]	248	1,447

The figures show that the failure of supplies from Germany the great drug "dumper"—has resulted in a vastly diminished importation of cocaine and morphia, and that this loss [?] has brought about an increased resort to drugs more readily obtainable locally; increase in the use of the pernicious drug "ganja" being specially marked.

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* *loc. cit.* p. 26.

† Report of the Chemical Examiner to the Government of Burma for the Year 1916. 10 pp. 1917. Rangoon: Office of the Superintendent, Government Printing, Burma.

DISEASE PREVENTION.

MALARIA.

Irrigation and Malaria.

The Sanitary Commissioner for the Government of Burma (Lt.-Col. C. E. WILLIAMS) in his Annual Report, 1916, makes the following observations* :—

"It is desirable to again direct attention to the excessive prevalence of 'fever' mortality in the artificially irrigated districts and in those where considerable populations live in the vicinity of 'terai' country; and to contrast the experience of these districts with that of others where neither of these factors of malaria is much in evidence. The rural areas of districts of the dry zone in which canal irrigation is most advanced show high fever mortality ratios. These are :—Mandalay (14·61), Shwebo (12·60), Minbu (11·62), Yamèthin (10·60) and Kyauksè (10·05).

"Terai conditions play an important part in Mandalay, Kyauksè, Yamèthin, and Minbu Districts, and less in Shwebo District. Contrast the experience of these districts with that of other districts of the dry zone where neither irrigation nor terai conditions are factors of any importance, and the fever death-rate is relatively low. Such are Myingyan (3·79), Sagaing (4·21), Meiktila (4·80); and with that of still other districts where terai conditions are to a greater or less extent factors in the problem, viz., Thayetmo (13·79), Pakôkku (8·73), Magwe (7·53), Lower Chindwin (7·95)."

Bush Clearing.

The main virtue of bush clearing in malaria prevention is the frequency with which unsuspected pools affording breeding facilities for mosquitoes are disclosed in the process. In the Annual Medical and Sanitary Report for Gambia for 1915, a good illustration of this is set forth by Dr. A. E. HORN. Incidentally the value of fish as larvicides is also exemplified† :—

"Clearance of undergrowth has been extensively carried out round the town and in the Old Cemetery. The latter clearing revealed the fact that there were three fresh water lagoons at the western extremity of the cemetery near to the seashore which were swarming with larvae (*Culex*). It was known that at certain periods, and when the wind was in the west or north-west, frequently great swarms of mosquitoes invaded the town, so that it was not unusual to be able to capture fifty to a hundred specimens of *Culex* from one ordinary sized window of mosquito gauze within two or three minutes. The cemetery was suspected of being the culprit and a close inspection revealed the above condition.

"The difficulty arose how to treat these comparatively large expanses of water and it was decided to fish-stock the two largest, about a dozen buckets of small fish obtained from the drains being carefully placed in them. The results were most satisfactory; the fish increased in number and the larvae disappeared entirely. The third lagoon—the smallest—together with several isolated pools was regularly oiled once a week, but this proved less satisfactory as the prevailing strong north-west wind constantly swept the film of oil to the leeward side of the pools, leaving the surface uncovered.

"The large salt water lagoon in which *Culex thalassius* breeds, referred to on page 14 of the Annual Medical Report for 1914, was stocked with some forty buckets of fish taken from the same drains as the above, with

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* Burma. Report on the Sanitary Administration of Burma for the Year 1916. 1917. Rangoon: Office of the Superintendent, Government Printing. p. 10.

† Gambia: Annual Medical and Sanitary Report for the Year ending 1st December, 1915. pp. 15–16.

equally satisfactory results. It is of interest to note that these fish appear to be able to acclimatise themselves to either brackish or salt water and they are of untold value to Bathurst, since they can be obtained for nothing and are voracious eaters of larvae. Constant care is however necessary to keep up the stock in the lagoons owing to wastage from predatory birds, such as egrets and kingfishers. Pits dug in the bottom of the pools afford some shelter to the fish."

Anti-Mosquito Measures, Khartoum.

Khartoum is one of the comparatively few areas in the Tropics in which the combating of malaria has been attempted. In this case, Dr. Andrew BALFOUR initiated energetic measures. Under his successor at Khartoum these are now bearing fruit, as shown by statistics embodied in the Report for 1916 of the Medical Officer, Khartoum (Dr. L. BOUSFIELD). Thus, in 1912, there were 75 cases of malarial fevers of local origin, against 10 in 1916. A description is given of the difficulties encountered in this area in combating anophelines; "approximately 22 miles of river banks with pools have to be kept under supervision besides all the house-to-house, steamer and boat and farmland mosquito inspection in Khartoum and Khartoum North." After alluding to the difficulty in dealing with mosquitoes imported by wood boats, trains, etc. and "the statement that some mosquitoes fly six miles away from their original breeding places" the Report details the methods pursued in treating areas which have been flooded by the rising of the Nile, leaving pools favourable for mosquito breeding, as follows :—

"(1) A rectangular area was marked out by four large upright poles and at one end a line of men about six feet apart was formed, each carrying a tin of larvicide or oil. These men were then marched through the crops, grass, etc., and all pools, etc., dealt with; sanitary inspectors followed behind, with men with extra supplies, to make sure all collections were dealt with. This arrangement was repeated again over new areas until the whole had been treated. Next day, mosquito inspectors worked through the area dealt with on the previous day to make sure all infestations were destroyed. By this method, it is believed over 100,000 anopheline larvae were destroyed in one day. (2) Other areas were drained into artificial pools, where the water could be easily dealt with. This method employs much labour and is only suitable in certain sites. (3) Some areas were separated from the White Nile by mud banks and then treated by larvicide or oil." [p. 8.]

As a larvicide special trust is placed in Ialine; it was found by numerous experiments that in dilution up to 1 in 25,000 it was very effective in

"killing young larvae in a few minutes, but pupae may remain alive for 24 hours but are eventually killed; the toxicity of Ialine to animal life has not been tested, but fish are readily killed by it. However, the smell is strong and we do not think animals or human beings would drink the water and so far no report of any damage to animal life has been received. It kills grass, but has not affected crops through which it has been used." [p. 9.]

Cyprus.

The campaign against malaria to which Sir Ronald Ross gave a special impetus in 1913 during a personal investigation, is now, according to the Annual Medical Report, Cyprus, for 1916, exhibiting definite results. In 1912, the total cases of malaria reported by the Government Medical Officers of the Island were 10,035; in the succeeding years, the totals were 7,342, 6,622, 4,539, and 3,752, respectively. Tested by the number of in and out patients treated for malaria a diminution is also found; thus, in 1912, the total was 5,819, and in the succeeding years 4,356, 4,044, 2,751, and 2,372, respectively.

Dr. CLEVELAND, Chief Medical Officer, reports that "Anti-mosquito work commences on an extensive scale in April in each year, as the winter months from November to March are generally speaking too cold for mosquito breeding, especially for Anophelines."

The summary of minor anti-malarial works shows that considerable activity had been exercised during the year—2,183 pools of a capacity of 545,366 c. ft. were filled in and 1,037 were drained, over 97,000 feet of drains were made and 238,000 feet of streams and water courses were trained, whilst 553,000 feet of drains were maintained. In the Nicosia District, "all pools of water within a mile of Sirianokhori were pumped dry." In the Famagusta District, the fresh water lake and the pools at seven villages were pumped dry. All tanks without fish were stocked with gold fish. In this area, as a result of drainage, additional land was reclaimed during the year bringing the total up to 1,977 *donums*.* "Total expenditure including salaries, drugs, etc., £3,420."

Larvicides.

In the Annual Medical and Sanitary Report of the Colony of the Gambia for 1916, p. 14, Dr. R. W. ORPEN, Acting Senior Medical Officer, the following remarks are made as to the efficacy of fish as larvicides and emphasizing BACOT'S belief in the inutility of tadpoles in this direction†: -

"The number of wells stocked and restocked with fish was 351, also 34 barrels. It can now be said that practically all the wells of Bathurst are protected from larvae by this means, and an important point to be remembered is that, out of the 351 wells stocked, only 127 were so treated as a result of a notice from the Board of Health; the remainder were stocked by the owners of the compounds, who come to the offices of the Board of Health and ask for fish, which they obtain, as a plentiful supply is always kept, their name and address is noted, and a few days afterwards the Inspector responsible for that particular district visits the compound in order to see that the well is stocked.

"For comparison the number of wells in 1915 found to contain larvae was 179; during the past year the total was 30.

"In the lagoons the fish have done their duty in a most noble manner; only on one occasion was there an outbreak of larvae, already referred to, and there has been a complete absence of the clouds of Culex that used to invade the town from time to time. There is not the slightest doubt that the fish—Chromis Bimaculatus (Bell) and Hemichromis Macrocephalus (Bleeker)—are responsible for this improvement. All the lagoons were connected up by means of canals, and the fish could pass freely from one to the other.

"In Mr. Bacot's report on his investigations on behalf of the Yellow Fever Commission (West Africa) (Reports, Volume 3, page 4), the following occurs: 'The pools are often tenanted by tadpoles, the mosquito larvae being found among the roots of the grasses, the frogs or toads with which these swamps abound being no doubt responsible for the absence of mosquito larvae in the open pools.

"A similar condition exists in Bathurst during the rains, and pools have been watched for long periods in order to see if tadpoles were destructive to larvae, and the unanimous opinion is that, in Bathurst at any rate, tadpoles and larvae live in perfect harmony."

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* Donum = 110 sq. yds.

† Gambia (Colony of the). Annual Medical and Sanitary Report for the Year 1916. 1917. London: Printed by Waterlow & Sons, Ltd. p. 14.

Fumigation.

Dr. ALEXANDER, Senior Sanitary Officer, in the Gold Coast Annual Medical Report for 1916, calls attention to excellent results secured by him in rooms by vaporising izal by means of a lamp, with the object of killing mosquitoes. He warns that care should be taken duly to moderate the heat applied to the receptacle containing the izal; otherwise a mass of soot may be produced. But with this untoward event avoided, the results on mosquitoes are evident with a minimum of trouble as compared with sulphur fumigation. He states that the advantages for fumigation by this method are:—

"(1) The apparatus is simple and what is desired is a combination of a receptacle holding enough fumigant to do a room of 3,000 cubic feet and a lamp capable of vaporising this amount in three hours.

"(2) The preparations required are small. No doors nor windows need pasting. The experiments were conducted in my own office where the windows are very ill fitting.

"(3) The destructive effect upon mosquitoes has been fully demonstrated.

"(4) The shortness of time required for preparation and fumigation is an advantage.

"(5) The damage to any article in the room would with a more perfect apparatus be infinitesimal.

"(6) The room can be entered a few minutes after the doors are opened and the smell quickly disappears.

"(7) The method is much cheaper than fumigation by sulphur."

Fecundity and Malaria.

The following contrast is made as to birth-rate in healthy and malarious districts, respectively, by the Sanitary Commissioner, Burma, in his Annual Report for 1916.*

"The Census Report for 1911, Part 1, page 125, supplies comparative figures of the child population under 10 years of age per 100 of married females aged 15-40 (i.e., at child-bearing ages) for all districts of the Province. Allowing for even a wide margin of error in these returns, which is to some extent automatically corrected owing to the large numbers of persons dealt with, we may accept these figures as a fairly reliable statement of the relative proportional distribution of the child population, and of the relative productive capacity of the several female populations in the different districts. It is therefore of special interest to note that the child population is materially reduced in the malaria-stricken districts as contrasted with that of the healthier districts, as is shown in the attached table."

Malarious districts.		Relatively non-malarious districts.	
Kyauksè	186	Magwe	245
Mandalay	188	Sagaing	244
Thayetmyo	198	Meiktila	244
Prôme	198	Myingyan	240
Yamèthin	208	Lower Chindwin ..	236
Ma-ubin	210	Pakôkku	223
Shwebo	218		

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* Burma. Report on the Sanitary Administration of Burma for the Year 1916. 1917. Rangoon: Office of the Superintendent, Government Printing. p. 11.

Panama.

Panama statistics (Report of the Health Department of the Panama Canal, June, 1917) still show that the deadly malaria which defied engineering efforts under the French, continues to find a secondary place in mortality causation under the American regime.

> "Diseases causing the highest admission rates to hospitals, in the order of their numerical importance, were: (1) venereal diseases, (2) malaria, (3) influenza, (4) diseases of the eyes and their annexa, and (5) lymphadenitis. These five diseases caused 29 per cent of all admissions to hospitals, venereal diseases alone causing 10 per cent and malaria 7 per cent of total admissions."

In the same Report, the difference between areas under anti-malaria conditions and those still unconquered are pointed out (p. 10):—

> "There were 33 admissions from malaria during the month from our 33,000 and odd employees: it will be noted that 25 of these cases came from construction, jungle clearing, and pasture gangs working at a distance from our sanitated town . Within the areas under sanitary control there have been fewer cases of malaria than ever before in the history of the canal for the corresponding season."

Infectivity of Anopheles.

M. Bruin MITZMAIN (U.S. Public Health Reports, 1916, September 1, p. 2335) as a result of a series of inoculation experiments found that, in nine instances in which two mosquitoes transmitted malaria, "at least one of the pair was proved to be capable of causing the disease when used single."

In experiments by the same authority (U.S. Public Health Reports, 1917, August 31, p. 1412) it was found that "an intermittent low temperature does interfere with sporozoite formation; consequently, it is explicable that mosquitoes procuring gametocyte bearing blood before winter sets in, may become sterile or innocuous during the hibernation period."

Mitzmain also reports "a partial confirmation of the results of Daniels in the relation of infection to the number of bites which the mosquitoes obtain. Fifteen examples of *A. punctipennis* gave the following results relative to infection with the parasites of malaria: One, two and three bites gave 12·5, 18·8 and 34·8 per cent respectively."

YELLOW FEVER.

Stegomyia.

Dr. A. E. HORN, in his Annual Medical and Sanitary Report for Gambia, 1915, states that no yellow fever occurred during the year, but he finds that the Stegomyia predominates and urges making a determined campaign against them. In a total of 622 mosquito specimens examined, he found Stegomyia 94, Culex 5·5 and Anopheles 0·5 per cent, respectively. Among the "various receptacles" in which they breed he specially mentions canoes. As a result of energetic action, it is now customary for these canoes to be kept turned upside down.

In connection with conservancy, he mentions that "during the year 38 cess-pits have been closed and 185 have been oiled. It is found that when waterlogged they are a common breeding place of Stegomyia."

SLEEPING SICKNESS.

Glossina palpalis.

The Senior Sanitary Officer, Sierra Leone, in his Report for 1916, states that in accordance with the opinions of Professor Warrington YORKE and Dr. BLACKLOCK, in that area the breeding places of this tsetse fly were got rid of by "stripping the oil palm of the lower petioles." 16,372 trees were thus dealt with. The work required 4 headmen at 1*s*. per day and 36 labourers at 10*d*. per day from November 26 to December 28, 1915.

KALA AZAR.

The Annual Sanitary Report of the Province of Assam for 1916 (Major T. C. McCombie YOUNG, I.M.S.) shows that the segregation of infected families* and removal to new sites as the procedure indicated in kala azar is yielding good results in Assam. Thus, in reference to work in the Golaghat sub-division, he asserts that‡ :—

> Certain "villages in this area in which we had in previous years carried out segregation operations, remained free from the disease, no fresh cases having been discovered in them during the year . . . . Measures of segregation and removal of infected villages have also been taken up in two badly-infected villages in the Nowgong district, and in two villages in Kamrup.
>
> "The policy we have followed is to endeavour to institute such measures in villages which from the reports of our travelling dispensary staff are found to be badly affected, as both from a humanitarian and from a public health point of view it is undesirable to allow their inhabitants to remain on a badly-infected site until depopulation terminates the outbreak, with the possibilities of spreading an acute form of the disease meanwhile. The help thus offered by Government is usually gladly received and with the co-operation of the district administration little or no unwillingness to move is experienced. The main difficulty is usually that of finding suitable 'basti'† land for the site of the new villages and where this can be overcome, the removal is fairly easily arranged."

PLAGUE.

Septicaemic Plague.

In this *Bulletin* [Sanitation No, Vol. 10, p. 8] a paper in the *Journal of Hygiene* by Drs. PHILIP and HIRST on plague in Ceylon was referred to. The persistence of septicaemic plague in the area was particularly brought to notice by the authors, and the bearing of this observation upon epidemiology was alluded to by the writer. In the Health Administration Report of the Public Health Department of the Colombo Municipality, Dr. PHILIP gives further expression to his views as to septicaemic plague, by pointing to the readiness with which this fatal form may be overlooked in anti-plague efforts. He states that, in 1914, of 413 cases of plague, 60 per cent. were reported as septicaemic, "all but one of which proved fatal." In 1915, in 128 deaths 58 per cent. were septicaemic in character, and in this form the mortality was 100 per cent. In contrasting the types found in Colombo with those prevalent in Northern India, Dr. Philip makes the following remarks on the Report for 1914* :—

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* See also this *Bulletin* (Sanitation No.) Vol. 6. p. 250.

† Village.

‡ Assam. Annual Sanitary Report of the Province of Assam for the Year 1916. Shillong: Printed at the Assam Secretariat Printing Office. p. 11.

"Some authorities contend that it is not correct to speak of a 'septicaemic' as opposed to a 'pneumonic' and a 'bubonic' variety of plague, for the reason that a condition of septicaemia exists in every type of plague. Where however as in the cases classed here as septicaemic, there is an entire absence of all the characteristics which differentiate the pneumonic and bubonic forms, and where moreover a state of practically pure septicaemia, due to the presence of *B. pestis*, exists it is difficult to see what more appropriate or correct designation than septicaemic plague could be applied. It appears to me that it would be more justifiable to object to the use of the terms 'bubonic' and 'pneumonic,' and that it would be more correct to adopt instead the designations 'bubonic-septicaemic plague,' 'pneumonic-septicaemic plague,' and 'septicaemic plague' pure and simple, since both the bubos and the state of pneumonia are merely inflammatory complications occurring in the course of an otherwise pure septicaemia. In support of this view one may state that the majority of the most virulent cases which died within 48 hours were of the purely septicaemic type there being no enlargement or even tenderness of the glands detectable by palpation, and no evidence of inflammatory consolidation of the lungs, whereas the less virulent cases which survived longer, although they were of the purely septicaemic type in their earlier stages, tended to develop inflammatory enlargement of the glands, i.e., bubos. In other words in the most virulent types the poison was so potent that it killed the patient before either the glands or the lungs had time to develop any inflammatory reaction. The most striking thing is that such a large proportion of the human cases here should have been of this very virulent type, whereas as is shown later the Ceylon strain of plague is not so virulent to rats as is that responsible for bubonic plague in Northern India. It may be suggested in this connection that the high proportion of septicaemic cases here is due to a large number of mild non-fatal bubonic cases having escaped detection, but the house visitations which were carried on in the infected localities were so frequent and so thorough that I feel sure such an explanation may fairly be rejected. On the other hand one sometimes wonders whether rapidly fatal septicaemic cases may not have frequently escaped recognition in other places thus giving a fallaciously low case mortality, since in Colombo at all events those which are found dead are extraordinarily lacking in physical signs of the disease. Even after a post mortem examination, although one may, as the result of repeated experience of the appearances in these cases, suspect plague, it is, as Dr. Hirst points out, impossible owing to the absence of gross organic lesions of any description, to arrive at a conclusion as to the cause of death without a bacteriological examination. My belief is that if we have missed cases of plague here, it has been this fatal septicaemic form and not the milder and much more easily recognised bubonic type."

Remarks.—The above notes are of value, as emanating from a Medical Officer of Health whose duty it was to observe epidemiology from the point of view of prevention and who, although cognisant of them, was not bound by current theories.

The writer's remarks [*loc. cit.*] show that septicaemic plague, at the origin of epidemics in the Madras Presidency, was a recognised feature from 1898 to 1905. But Dr. Philip brings to notice a further point in practical work, namely, the possibility of septicaemic cases being classed under other causes of mortality owing to their short duration and absence of buboes. In the Madras Presidency, this important practical point was fully recognised and led to the following form of legislation* :—

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* Colombo Municipality. Administration Report. 1914. Public Health Department. 1915. Colombo: S. M. Johar, Municipal Printer, Ceylon, p. 3.

> "The local authority of the place of destination shall keep himself promptly informed of all arrivals from infected or notified areas, shall report to higher authority every arrival who is not passported and shall see that, on the arrival of a passport holder, he is observed daily for ten days.† Any case of illness or death in the house in which such passport holder is or has been residing shall be forthwith reported with full details to the nearest plague officer or assistant plague officer, or to the nearest medical officer. Particular attention should be paid to cases of fever accompanied with acute affection of the lungs, as these symptoms may indicate the existence of pneumonic plague. The appearance of glandular swellings, even though attended by constitutional disturbance so slight as not to prevent the patient moving about, the occurrence of abortion amongst women, of convulsions amongst children and of sudden death in the aged, should be regarded as suspicious and should be reported. . . .

It is a curious fact that in the many publications descriptive of plague epidemics, room is rarely found for allusion to the forms above mentioned. Especially are remarks rarely made as to the frequency and fatality of abortion due to plague. Yet, having regard to the number of women pregnant in a population, the occurrence cannot be rare. Racial peculiarities of midwifery treatment, including modes of dealing with discharges and the placenta, then become of public sanitary interest. In the official "Plague Inspectors' Manual" [1900–1902] by W. G. King, used in the Madras Presidency, the following reasons for caution [p. 18] are urged : --

> "But there lurks a special danger under the second heading referred to, namely, failure of diagnosis. Plague presents no rigid type of symptoms . . . whilst there are certain signs *common* to the disease, there are others which are recognised only in *special* forms. Thus, whilst the bubonic form presents no difficulties, the pneumonic, toxic, puerperal and atypical forms may mislead. . . . The patient suffering from the pneumonic form might be judged as having 'fever and cold'—a common method of speaking of malarial fever attended with catarrh of the respiratory tract ; yet, this form of the disease is particularly dangerous in respect to spreading infection, in that the sputa are crowded with plague microbes, which, on each act of coughing or spitting, are liable to be scattered in the patient's surroundings. Toxic plague, especially when occurring in the aged, may mislead by reason of the suddenness of its incidence, and consequent confusion with failure of heart or occurrence of apoplexy. In the puerperal form, the possibility of plague is likely to be forgotten, when contemplating the pronounced symptom of abortion. In the case of young children, the irritability of the nervous system is apt during invasion of plague to be followed by convulsions and death, so that the observer is liable to assume that he has to deal with a case of convulsive attacks of the young from ordinary causes."

The terms used are of course applicable merely to clinical symptoms ; but if work is conducted with lay Sanitary Inspectors, as a first line of defence, adherence to this terminology is of great advantage in fixing their attention, as well as that of the general public, on the septicaemic "no-bubo" forms of plague, and thus avoiding the overlooking of cases to which Dr. Philip alludes.

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* Extract from No. 7 of the "Plague Regulations in force outside the Presidency Town."

† [*Later reduced to seven days.*]

Glandular Enlargements.

Dr. E. C. Long, Principal Medical Officer, Basutoland, in his Report for 1916 thus alludes to measures of surveillance in reference to an outbreak of plague which occurred in the Orange Free State :-

> "During the early part of the year there was an outbreak of plague in the Orange Free State, the nearest cases being about forty miles from our border, near enough to cause grave anxiety lest the disease should be introduced into Basutoland. The strictest possible precautions were taken to prevent this. The movement of natives between the two Territories was restricted as far as possible, and a detention camp organised near the Maseru Station in which all sick natives returning home were quarantined. The possibility of cases of *pestis minor* escaping notice was a great source of anxiety as none of the Medical Staff have any personal acquaintance with the disease. Glandular swellings in the groin are extremely common among the natives (I should say quite 70 per cent. have enlarged inguinal glands) probably due to minor septic absorption from cuts or scratches on the bare extremities."

When plague was first introduced into Calcutta, and Professor W. J. Simpson (then Health Officer of that City) insisted that it existed whilst the optimistic members of the profession would not accept that view, the prevalence of enlarged inguinal glands from various causes was much discussed; and, amongst other theories, it was asserted that enlarged inguinal glands at times attended malarial fever. The extent to which such conditions exist amongst Basutos is remarkable.

Haffkine's Vaccine.

At p. 114 of the Report on Sanitary Measures in India for 1914–15 reference is made to certain experiments conducted in the Bombay Bacteriological Laboratory as to grade of protection afforded by Haffkine's vaccine. It is stated that these

> "indicate that the amount of protection afforded by inoculation would be still higher were it possible to submit the subject to two inoculations at an interval of a week, the first dose being half the amount at present given. Not only does such a procedure confer a greater degree of immunity but it is accompanied with less pain and discomfort. The drawbacks to the procedure on a large scale are, however, obvious. Not only would a larger staff be required than at present, but difficulty is likely to be experienced in getting the average Indian villager to submit to the second inoculation."

Mauritius.

According to Dr. F. J. R. Momple, Acting Director, Health Department, Colony of Mauritius, in his Annual Report for 1915, the types of plague found during that year were bubonic, 22, septicaemic, 4, pneumonic 7. The total cases were greatly less than in any previous year since the invasion of the Colony by plague in 1899. The lowest mortality (in 457 cases) was in 1909, namely 72·9, and the highest was in 1914, when (in 125 cases) it reached 88 per mille. In 1914, the infection rate of rats was 1·7 per cent.; in 1915, 1·7 per cent.

Fumigation.

A practical difficulty both with sulphur dioxide and cyanogen gas is that of uniform distribution in the space treated, and in the power of penetration of the respective gases. Whilst making experiments on the subject, Surgeon S. B. Grubbs of the U.S. Public Health Service, found* that "a rat that had shown no symptoms after one hour exposure to cyanide gas in the room was quickly overcome when a small electric fan was started in order to drive the gas through a window. This incident was the more remarkable as the window was on the opposite side of the room and the fan was on the window sill, driving the gas outside."

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* Public Health Reports. 1917. May 11. Vol. 32. No. 19. p. 699.

Experiments made in the light of this observation showed that circulation of gas by electric fans in confined spaces gave "better results in one hour than in one and a half hours without the fan, everything else being equal; or, the time being the same, four ounces of sodium cyanide with the fan did as well as 6 ounces without it."

Assistant Surgeon-General **Creel** (U.S. Public Health Reports, 1916, June 9, p. 1466) advises the following proportion, respectively, for cyanide and sulphur for insect destruction:—

"*For mosquitoes.*—Potassium cyanide, 0·4 ounce per 1,000 cubic feet of space, exposure for 15 minutes.

"Sulphur, 2 pounds per 1,000 cubic feet of space, exposure for 1 hour.

"*For bedbugs.*—Potassium cyanide, 5 ounces per 1,000 cubic feet of space, exposure for 1 hour.

"*For body lice.*—Potassium cyanide, 10 ounces per 1,000 cubic feet of space, exposure for 2 hours.

"Sulphur, 4 pounds per 1,000 cubic feet of space, exposure for 6 hours.

"*For [cock]roaches.*—Potassium cyanide, 10 ounces per 1,000 cubic feet of space, exposure for 1 hour.

"Sulphur, 4 pounds per 1,000 cubic feet of space, exposure for 6 hours.

"*For fleas.*—Potassium cyanide, 2½ ounces per 1,000 cubic feet of space, exposure for 15 minutes."

Fumigation of Ships.

The U.S. Public Health Report, September 7th 1917, contains the result of experiments by Asst. Surgeon General R. H. **Creel** and Asst. Surgeon F. **Simpson** as to the relative efficacy of sulphur and cyanide fumigation of vessels for destruction of rats. They employed cyanide in a proportion of "5 ounces per 1,000 cubic feet of space with duration of exposure of 1¼ hours for holds and one-half hour for superstructures." . . . .

"Sulphur when used was in the proportion of 3 pounds per 1,000 cubic feet of space, with duration of exposure of 6 hours for holds and superstructures alike."

The test of efficacy was held to be the grade of freedom from infestation by rodents, as ascertained by subsequent trapping. This test they admit is rough, but, as it was applied to both vessels in which cyanide gas and sulphur was used, they believe that their conclusions are reasonably accurate. They state they found "a very marked disparity in the efficiency of sulphur dioxide as compared with cyanide gas, in the treatment of superstructures. These compartments, such as store rooms, poop decks, crews' quarters, etc., are generally partially filled with supplies, stores, dunnage, etc., and it would appear that the greater effectiveness of cyanide gas is due to its greater penetrating powers, as well as toxicity."

The fumigation with either gas in unloaded holds proved no material difference in efficacy, but in cargo laden holds there is indicated a greater efficiency in the case of the cyanide gas. Conditions in store rooms, crews' quarters, poop decks, etc., are more or less similar to those of loaded holds, and, on the basis of the results of the fumigation of these superstructures, it is believed that it can be safely asserted that cyanide gas is far more effective in the fumigation of loaded holds than is sulphur dioxide.

CHOLERA.

The disinfection of wells in areas selected as peculiarly liable to cholera outbreaks by means of chloride of lime, has been pursued in the United Provinces of Agra and Oudh (according to the Annual Report of the Sanitary Commissioner for that Province) since 1912. The Sanitary Commissioner (Lt.-Col. S. A. HARRISS, I.M.S.) thinks favourably of this method, but finds the statistics of former years so probably erroneous that he hesitates to assign a value deduced by contrast of figures at the present time and before 1912. In the meantime, he makes the following remarks as to methods of distribution†:—

"The main difficulty with the scheme is not in the efficacy of the drugs to achieve the desired result but in getting the patwaris* to take prompt action. Although the use of bleaching powder has been well reported upon by local authorities, its method of distribution must be changed as it rapidly corrodes tin and loses its chlorine. . . It was considered advisable to stop the supply pending provision of glass bottles. Difficulties in producing these bottles have been solved by the Allahabad Glass Works, Naini, and arrangements have been made to fill these bottles with bleach at the Cawnpore Jail, the necessary materials being supplied by the sanitary department and to issue the drug in this form for the year 1917."

TYPHOID.

Australia.

During 1916, a Committee was appointed to consider and report on the causes of death and invalidity in the Commonwealth of Australia in respect to typhoid fever. The Committee was composed of Sir H. B. ALLEN, Drs. J. H. L. CUMPSTON, A. Jeffreys WOOD and James MATHEWS, M.P. The method selected by the Committee for the enquiry was to consider all recognized agencies in the spread of typhoid, and then determine, from the conclusions arrived at by experts, how far such and such factors were predominant in Australia. The following is the summary afforded by the Committee as to the chief factors‡:—

"From the evidence which has been collected it appears that for Australia the occurrence of typhoid fever on a large epidemic scale is associated with and largely dependent upon imperfect sanitation (by which is meant particularly inadequate methods or lack of methods of disposal of night-soil), and is largely eliminated by the introduction of a proper system of night-soil collection and disposal.

"Notwithstanding the introduction of such methods, a residual prevalence of typhoid persists, and this is largely in Australia the result of direct or indirect transmission of infection from the infective person to the healthy—most frequently by food infection. This conclusion was definitely arrived at by Dr. Jamieson from his careful continuous study of these residual cases in Melbourne.

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* Village officials.

† United Provinces of Agra and Oudh, 49th Annual Report of the Sanitary Commissioner for the Year ending 31st December, 1916. 1917. Allahabad: Government Press. p. 10.

‡ The Parliament of the Commonwealth of Australia. Department of Trade and Customs. Committee concerning Causes of Death and Invalidity in the Commonwealth. Report on Typhoid Fever. 1914–16. No. 297. 1916. State of Victoria: Albert J. Mullett, Government Printer p. 9.

"The *rôle* played in Australia by indirect agents other than food has frequently been assumed or surmised, but has as yet not been satisfactorily defined. . . .

"It follows obviously from what has gone before that if the infective person can be prevented from infecting others he becomes innocuous to the community. He may be so rendered innocuous by the *disinfection* of his excreta. This can be insured by :—

"(*a*) Effective collection and disposal of the excreta of the whole community.

"(*b*) Close control of the infective person, as, for example, the control exercised by nurses in hospital, and the disinfection of all the patients excreta by persons trained in such methods of disinfection."

It will be seen that the Committee, without questioning the importance of this factor elsewhere, give to waterborne epidemics a minor place in the medical history of Australia. They state [p. 8] :

"(*a*) Public water supplies have not been incriminated in Australia, nor even under suspicion, except in one instance, in which the suspicion was definitely removed. Testimony is emphatic that outbreaks are not traceable to this source.

"Domestic water supplies have been more often under suspicion. Proofs in Australia have, however, been lacking. Occasional epidemics have occurred in which the sources of infection have remained obscure in spite of investigation. Such point to the necessity for further investigation of the life-history of the bacillus and its relation to other bacilli of the colon group.

"(*b*) By the washing of milk vessels, or adulteration of milk with water.

"(*c*) By the use of water to make ice-creams or cordials.

"These two may well be discussed together. Both are extensive practices, and many epidemics have been definitely shown to have spread in this way in Australia. But in those cases of milk epidemics or ice-cream epidemics which have been well investigated, the source of the infection has been shown to be a human agent directly infecting the food by handling and not through the medium of the water.

"(*d*) By the contamination of shell-fish.

"This mode of spread, although occasionally recognised in other countries, has been shown to have produced only one insignificant outbreak in Australia."

Indeed the Committee give expression to their chief finding thus : —

"A reduction in the typhoid mortality rate has been produced by the introduction of measures of sanitation. The principal measure of sanitation has probably been the controlled disposal of human excreta."

The following are some of the more important recommendations by the Committee [p. 1].—

"1. That, wherever possible, existing defects in routine sanitation should be sought and rectified, and that the introduction of water-carriage methods of disposal of sewage be encouraged in every way.

"For both sewered and non-sewered areas, the methods of disposal of typhoid excreta should be standardized and rigidly enforced by each Health Authority. The important aspect of infectivity of urine should receive particular attention.

"2. The introduction of any possible improvement in the legislative or administrative machinery for the early notification of cases of typhoid.

"3. The bacteriological examination before discharge from hospital or before release from treatment of all cases of typhoid fever.

"4. The notification by the hospital authorities of all carriers so discovered and the institution of means for (*a*) instructing such carriers concerning necessary precautions; (*b*) prohibition against such carriers from engaging in any occupation involving the handling of foodstuffs; (*c*) the supervision of and occasional bacteriological examination of such carriers."

Anti-typhoid Inoculation, India.

The Report of the Sanitary Commissioner with the Government of India for 1915, states in that year over 93 per cent. of all European troops in India had been inoculated. In the period ending 30th June, amongst the inoculated 1·4 per mille contracted typhoid fever and amongst the uninoculated 4·9 per mille; in the period ending the 31st December, the rates were 2·4 and 4·7, respectively. "Re-inoculation is urged after two years, as it is certain that the protective efficacy of inoculation is lessened after that period, and this measure is now progressing steadily."

Circumventing the "Carrier."

At Naini Tal and Wellington, convalescent depots have for a considerable period been established. In these depots, bacteriological tests of faeces and urine are carefully carried out, and the question of when discharge can be safely permitted is determined.

In Great Britain, the same method which has been systematically applied to the convalescent soldier during the present war must have been of infinite benefit in protecting the civil population from the reflex of war conditions. The routine method of examination of 3,198 specimens of faeces and 3,056 of urine at Naini Tal was as follows:—

"*Examination of the faeces and the urine.*

"As has been the custom, each convalescent as soon as he arrives at the depot is put on the 'First test' which consists of ten days' consecutive examination of both the faeces and the urine. The second and third tests are carried out as soon as possible and each lasts for five consecutive days. Latterly, owing to the large number of plates and the quantity of culture medium required, the urine examination has been omitted from the second and third tests unless the first has proved positive. It is extremely unlikely that a 'carrier' would be missed by this procedure. During the year the Endo medium has been used in preference to either Conradi-Drigalski or McConkey. A series of tests proved that the growth of the typhoid group was more rapid, more abundant and not so steadily overgrown by *coli* on the Endo, and confirmed the recent work of other observers." [*loc. cit.* p. 16.]

The opinion given as a result of these systematic examinations is:—

"that the great bulk of the fever obtaining amongst the British troops in India at present is para-typhoid 'A,' and it is possible that, were the agglutination tests carried out more systematically throughout the course of the disease, much of the uncertainty regarding the diagnosis of the pyrexias of uncertain origin would be removed." [*loc. cit.* p. 17.]

At the Wellington depot, the task involved the examination of 13,352 plates resulting in the detection of four carriers. In reference to methods pursued, it is remarked:—

"In the course of investigating carriers this year, the method of incubating faeces and urine for twenty-four hours in peptone water with varying dilutions of brilliant green, and then plating on to Conradi, Endo's and ordinary agar plates was given an extensive trial. In this laboratory, it was found that no better results are obtained in so far as the enteric group is concerned than when the routine method, i.e., of incubating for half an hour before plating on to Conradi media, is employed. On the contrary the brilliant green method appears to favour the growth of *Bacillus pyocyaneus.*" [*loc. cit.* p. 24.]

Typhoid amongst Indian Troops.

It is reported that anti-typhoid inoculation is making fair progress, and that "in some regiments practically all the men of the battalion were inoculated." The fact that "Gurkhas usually show a greater predisposition to this disease than other Indian and British Troops" is demonstrated by a table (p. 43) exhibiting statistics from 1909 to 1915. In an epidemic at Kohat, in March 1915, Gurkhas inhabited the Chamberlain lines and six cases of typhoid and 12 cases of paratyphoid were admitted. The disease was confined to the lines.

"Much time was spent in investigating the origin of the disease. The water from the stream and bathing tank, the milk, meat and fish, from the lines to which the disease was confined, were examined without result. The cooks, bunniahs, sweepers and others were brought to hospital, and their stools were examined and cultured in the usual way. After many days hard work two typhoid carriers were found in the lines, one a sweet-seller and the other a butcher."

UNDULANT FEVER.

At a certain period of its history the name of Malta was attached to this fever, and the doubtful honour was not appreciated by the Island. Indeed, it has hastened to get rid of all reason for connection with it, not only in reference to now recognised nomenclature, but by energetic measures to forbid its presence in its midst. In the Report on the Public Health Department of Malta for 1914–15, it is stated that amongst the civil population there were 321 cases with 22 deaths; whilst amongst the military and naval population there were only four cases. Dr. G. Caruana SCICLUNA in noting this states: —

"The present satisfactory state of affairs can be attributed only to the strict precautions taken by the military and naval authorities against the drinking of goats' milk." In spite of constant urging by this Department he asserts, "evidently very little is done in this direction by the civil population. . . . In connection with this fever, 4,965 goats and 2,450 sheep were examined during the year. 385 goats and 18 sheep were found infected and consequently destroyed."

TUBERCULOSIS.

India.

In reviewing the mortality of the Indian Army the Director of Medical Services, at p. 48 of the Annual Report of the Sanitary Commissioner for the Government of India, for 1915, points out that the Gurkhas show "a much greater predisposition to this disease than other Indian troops." Causation is not discussed. From the table provided to illustrate the fact, the following figures are quoted :—

Admission for tubercle of lung per 1,000.

Year.	*Army of India.*	*Gurkhas.*
1906	2·5	5·2
1908	3·0	5·0
1910	2·4	3·6
1912	2·0	4·1
1914	2·2	4·5
1915	2 8	4·4

In the Appendix to the Report above mentioned [p. xxvi] admissions for Jails of India are given for tubercle of the lung as follows :—

Year.	*Admissions per mille.*	*Year.*	*Admissions per mille.*
1906	8·8	1912	9·6
1908	9·4	1914	9 8
1910	8·7	1915	8·5

Khartoum.

Dr. L. BOUSFIELD, M O. H. Khartoum, in his Annual Report for 1916, asserts that notwithstanding the few cases of this disease officially notified "the medical men in Omdurman all agree the disease is becoming more widely spread every year." He considers "a return of 89 cases of tuberculous glands is very interesting for the following reasons :—

"(1) Captain Soutar, of the Veterinary Department, informs me that a tuberculous cow has never been found locally amongst the Soudanese cattle.

"(2) No tuberculous goat has been discovered and only two camels suffering from this disease, and in each case the disease was of the lungs and the udders were not affected.

"(3) That amongst approximately 60,000 Sudan cattle slaughtered in the Egyptian Abbatoirs, only two cases of tuberculosis were discovered. . . .

"I understand from Dr. Lloyd that the majority of the cases are in young children, that they are clinically like tuberculous glands, that caseation occurs and chronic sinuses form. He feels convinced they are not specific or septic. To make sure as to their nature he has agreed to send over in future some of the glands removed for microscopical examination.

"Now, according to all recent research on glandular tuberculosis, especially in young children, it has been found that the majority are due to the Bovine Tubercle Bacillus and yet this appears not to exist in the Sudan. The Tubercle Bacillus in the very young seems to prefer to attack the lymphoid tissues rather than the lungs and amongst the natives their habits of living and feeding from the same bowls, spitting on the floor, and excluding all fresh air on cold nights afford excellent chances for the infection of others and it is this exclusion of the Bovine Tuberculosis and the prevalence of this clinical glandular tuberculosis of children that may reasonably help to cause us to deduce that pulmonary tuberculosis is becoming very rife amongst the natives." [p. 19-20.]

Ceylon.

Dr. G. J. RUTHERFORD, Principal Civil Medical Officer and Inspector-General of Hospitals, Ceylon, in his Annual Report, 1916, gives the following details of efforts for combating tuberculosis* :—

> " The Anti-Tuberculosis Institute, situated in the St. Sebastian quarter of Colombo, was opened in October, 1916. . . . The staff consists of a specially trained medical officer, a matron, and a nurse, and an apothecary. The central institute is a handsome two-storied and well-equipped building, with a large waiting-room, physician's office, consulting room with an ante-room clinical laboratory, X-Ray room, and dark room on the ground floor, while upstairs there is residential accommodation for the apothecary, matron, and nurse, and also a Board room. . . . The staff visit patients in their homes, and give advice as to cleanliness, diet, ventilation, and precautions necessary to prevent spread of infection. Ample provision has been made for modern clinical methods of diagnosis in the well-equipped laboratory and X-Ray room, both being furnished with up-to-date apparatus. By means of leaflets and pamphlets in English and the vernaculars an active propaganda has been initiated for awakening people to the dangers of infection, and for the early recognition of the disease for purposes of cure. . . . There is room for about 200 patients in the six spacious wards."

Gold Coast.

According to the Gold Coast Annual Medical Report, for 1916, " There appears to be reasonable fear that the disease is increasing both in extent and virulence in the more important centres of the population."

Gilbert and Ellice Islands.

According to Dr. MCNAUGHTON, Senior Medical Officer, Gilbert and Ellice Colonies, tubercular diseases, so far as he has been able to observe, exist in the form of tuberculosis of the lungs or glands. " The first or consumption is fairly common and is always rapidly fatal; these cases develop what in England is called " galloping consumption." Segregration of the pulmonary cases and the use of the sputum bottle is constantly urged by him, with apparently hopeful results—although he is prepared to find " the admonition will have to be given one hundred times " to secure compliance. As one of the unfavourable factors in connection with spread of the disease, he has found that the use of mosquito-nets is not followed but, instead of net, calico is employed—thus diminishing vastly the chances of a " fresh " and clean atmosphere. Against this he has instituted a crusade.

LEPROSY.

The Annual Medical Report for Cyprus, 1916 (by Dr. R. A. CLEVELAND, Chief Medical Officer) reports that 90 lepers remain upon the Leper Farm against a total of 111 in 1901. In connection with the Farm, a special home is maintained for children born of leper parents resident at the Farm. There are at present in the home eleven children of from 17 to 6 years of age. Four children after receiving an education have been discharged. Dr. RICHARDSON states :—

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* Ceylon Administration Reports for 1916. Medical. Report of the Principal Civil Medical Officer and Inspector-General of Hospitals for 1916. p. B. 6.

> "It is interesting to record that in all these children, the eldest of which is now 21, no signs of the disease, from which their parents suffered, have yet appeared. It is significant also that out of a regularly maintained staff of 19 warders and attendants of both sexes, engaged in the Farm during the past 25 years, no case of this disease occurring amongst them has come to the knowledge of this Department." [p. 7.]

ANTHRAX.

A more direct form of preventive treatment of hides against the conveyance of anthrax than practised in Great Britain is conducted at Panama, which is thus described in the Report of the Health Department of the Panama Canal for the month of April 1917 (p. 14).

> "The work of supervision of the disinfection of hides with use of $\frac{1}{1000}$ of bichloride solution was taken over by the Panama health office during the month All hides passing through the city, coming from areas known to be infected with anthrax and other serious infectious diseases of cattle, undergo disinfection prior to receiving the American consular certificate. Suitable space has been set aside in the Panama Railroad city stables where adequate sewer connection, water supply, concrete floors, etc., are at hand. The work of disinfection is carried on at this place. Vats for soaking in bichloride solution, vats for salting, areas for drying, etc., have been installed in the stables, and the work now under supervision of the health office is being carried on effectively. Between 2,000 and 3,000 hides and several hundred pounds of goat and deer skins are passed monthly through the disinfecting plant."

SMALLPOX.

Dr. FOY, Port Health Officer, Rangoon, in his Report for 1916, affords a table exhibiting the state of vaccination in the case of 103,096 passengers. It may be safely assumed, though no statement to this effect is made, that these were all deck passengers intended for coolie labour and, except a few Chinese, the majority were Indians. An analysis of the Table gives the following results :—

Male adults	147,667	Vaccinated	620	per mille.
		Smallpox	197	,, ,,
		Unprotected	183	,, ,,
Female adults	8,997	Vaccinated	701	,, ,,
		Smallpox	241	,, ,,
		Unprotected	58	,, ,,
Boys	5,293	Vaccinated	693	,, ,,
		Smallpox	69	,, ,,
		Unprotected	239	,, ,,
Girls	2,117	Vaccinated	700	,, ,,
		Smallpox	46	,, ,,
		Unprotected	254	,, ,,

Considered roughly—in the absence of a dissection of figures by ages—the above would support the view (which is sufficiently established by statistical returns from the Vaccination Departments of various Provinces in India) that increasing attention to vaccination of populations is steadily diminishing the incidence of smallpox generally, and that the child population is reaping the benefit of infantile vaccination. It also shows that re-vaccination is a desideratum.

ANKYLOSTOMIASIS.

Ceylon.

The following extract from the Medical Report for Ceylon 1916, shows the manner in which the Rockefeller International Health Commission is at present co-operating with the Civil Authorities in Ceylon, in a campaign against ankylostomiasis:—

"The methodical and systematic campaign against the disease commenced in 1915, under the auspices of the International Health Commission and the Rockefeller Foundation, U.S.A., with the guidance and direction of Dr. John E. Snodgrass. The cost of control, direction, equipment, and supplies are borne by the International Health Commission and the Rockefeller Funds, while the cost of subordinate staff assistants, clerks, dispensers, microscopists, furniture, utensils, stationery, printed matters, disinfectants, &c., is being contributed by Government and estate owners. A committee of local control was appointed by His Excellency the Governor in July, 1916. An area of about 7 by 10 miles in the Matale District was selected for the commencement of the campaign, comprising 24 estates with a population of about 8,000 and a village population of about 1,800. The campaign, besides the treatment of those affected, consisted in the establishment of latrines on estates and in villages, the dissemination of knowledge of the causation, pathology, and curability of the disease (by means of lectures, pamphlets, and demonstrations), the education of estate dispensers in the technique of microscopical and clinical diagnosis of the infection, and the dosage and precautions necessary in the employment of the recognized curative agents. Fifty-one estate dispensers and two qualified doctors were instructed in these matters by the Director of the campaign during the year. To supplement the above, I issued a leaflet in simple graphic language, in colloquial Tamil, to be read to coolies assembled at muster . . . . . The activities of the Medical Commissioners and their assistants have therefore to be devoted, not only to the cure of the disease, but to its prevention. The latter was, as frequently pointed out by my predecessors and myself, only possible with the introduction of a universal latrine system on estates and villages under legal compulsion and official supervision . . . . The rule was promulgated by His Excellency the Governor in the *Government Gazette* of November 10, 1916. Plans and specifications of suitable latrines on the pit or pail system were issued from this office to superintendents on application."

Seychelles and British Honduras.

In the Annual Medical Report for 1916 of the localities concerned the following references to ankylostomiasis are made:—

Seychelles.—This disease is "very prevalent as usual and seems to be the cause of much of the inertia from which the people suffer." Dr. KENDRICK, a specialist under the International Health Commission, is working there and from the attitude of the people "there is every likelihood that the campaign will prove successful."

British Honduras.—Dr. HACKETT "found an infection in Corozal of under 25 per cent., with practically no severe anaemia resulting from the parasite."

FOOD.

Fixed Diets.

The Prisons Department, Egypt (which is subject to the Ministry of the Interior) has published a Report by a Committee appointed to investigate the dietary conditions of convicts.* The subject had been under consideration since March 1914, up to the autumn of 1916. It is therefore not surprising to find it was thought necessary to publish an Interim Report. In compiling this, the Committee have secured from Dr. W. H. WILSON remarkable contributions in the form of various memoranda on diet. Whether or not the Committee ultimately adopt any of the suggestions made, these memoranda will remain a source of valuable information for the sanitarian interested in the question of fixed diets for oriental prisoners. Dr. WILSON has written a treatise embodying the opinions of practically all recognised authorities on diet, commencing, necessarily, with special attention to the conclusions arrived at by Major McCAY, I.M.S.*

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* Egypt. Ministry of the Interior. Prisons Department. Interim Report of the Prison Diets Committee. 1917. Cairo: Government Press. 63 pp.

Dr. KIRTON, in supporting his views of the sufficiency and efficiency of existing diets, produces statistics which go to show a reduction of mortality of the prisoners from 22 per mille in 1902 to 13·2 per mille in 1910, when the total admissions to the jail (in round numbers) were 148,000 and 117,000 respectively. The existing diets were introduced by Dr. Kirton in 1905. They are known as No. I, for prisoners without labour, No. II for those on light labour, No. III for those on hard labour. The respective caloric value of these is 2,702, 3,122 and 3,230.

Dr. Kirton considers that from 1902 onwards, improvements in sanitation were made and exhibited an influence which he would not ignore; but he holds that the special factor concerned in reduction of mortality was the introduction of the diets which it is now sought to change. On the other hand, the Committee "do not fear that such alterations in the diet as they propose will lead to a recrudescence of disease." Apparently, the chief point the Committee criticize in the diet is that an unusual proportion of the protein (as used by an Eastern population) is derived from the expensive item meat. Dr. Kirton takes exception to the opinion that the use of meat to the extent he has advocated is, under present administrative conditions in Egypt, otherwise than necessary and, further, insists that the expenditure is not wasteful.

Probably the labours of the Committee would have been of less duration, had they, in the first place, made a complete investigation into the health condition and labour requirements of convicts, and established any facts showing either the inadequacy or excessive cost of existing diets. Instead of this, according to Dr. Kirten "the attention of the Committee has been focussed on meat."

It is not proposed to follow the pros and cons of the arguments of those holding the diverse opinions which have been placed before the Committee; but as the collection of data as to the value of various diets represents a troublesome task that may at any time be demanded of the practical sanitarian in the tropics, it may prove of utility to render these available to the reader of the *Bulletin*. Hence, the following data and opinions are quoted verbatim:—

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* *Scientific Memoirs by Officers of the Medical and Sanitary Departments of the Government of India.* (New Series) No. 48. 1911. Calcutta · Superintendent Government Printing.

Table showing approximately Constituents and Energy Value expressed in Calories of certain Diets.

"No allowance made for non absorption of food, which is greater in vegetable than mixed diet; consequently Egyptian diets appear better than they should, compared with Egyptian Army diets, *e.g.*, butter from animal source (except in case of hard labour diet), meat. So also in European prison diets, but not so much as in case of Egyptian prison diets.

		Proteid.	Fats.	Starches.	Value in Calories.
Egypt	Prisoners. Bread diet ..	39	11·7	390	1,861
	Non-labour I	79	33	506	2,702
	Labour II	92	43	572	3,122
	Hard labour	102	48	572	3,230
	Army in peace time	116·6*	39·5	512·05	2,491
Standard extracted from Dunlop report on prison dietaries. Scotch.	Male prisoners unemployed	90	30	440	2,400
	Convicts less active labour	120	50	550	3,200
	Convicts more active labour	150	65	550	3,500
Actual diets ..	Male light labour, Scotch ..	153·98	50·62	536·08	3,300
	Male light labour, English	141·47	59·25	546·68	3,373
	Male hard labour, Scotch	165·44	56·54	566	3,525
	Male hard labour, English	177·46	86·08	641·56	4,159
English soldier in peace time receives (1) free issue of 12 oz. meat and 1 lb. bread, caloric value 1515. (2) In addition 3*d.* a day which is posted. (3) What he likes to spend from his pocket in food. But for foreign service and in India (1) the meat is increased to 1 lb., making the value of (1) up to 1636 calories.		† A. Typical diets supplied for (1) and (2) at Aldershot			2,909
		‡ B, C.—In India			3,116
		§ C.			3,090
Values of other prison dietaries		—	—	—	—
French		104* ‖	—	-	2,700*
Bengal *Jails* ..	Bengal ordinary, Scale I ..	100 ¶	24	651	3,302
	Bengal ordinary, Scale II ..	113**	25	695	3,544
Behor ordinary, Scale 1–6		From 115 to 128	From 27 to 46	From 666 to 739	From 3,452 to 3,970

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* Qasr el Aini, "Report on diets," 1902.

† A.—Breakfast : fried liver 6 oz., bread 6 oz., tea and sugar.
Dinner : beef 5½ oz., pease soup 7½ oz., potatoes 16 oz., bread 5 oz.
Tea : bread 4 oz., dripping 1 oz.
Supper : porridge 2 oz., sugar.

‡ B.—Breakfast : fried bacon 3 oz., bread 7 oz., tea and sugar.
Dinner : meat 5 oz., or Irish stew, including haricot beans and lentils 1½ oz., potatoes 10 oz., bread 5 oz.
Tea : bread 4 oz., jam, tea, sugar.
Supper : fish and potato pie, 8 oz.

§ C —Breakfast : bacon 3 oz., eggs 2, bread 4 oz., tea and sugar.
Dinner : beef 5½ oz., Yorkshire pudding 4 oz., potatoes 8 oz., bread 4 oz.
Tea : currant cake 5 oz., tea and sugar.
Supper : curried fish 4 oz., bread 3 oz.

Note that all these diets contain a considerable quantity of food delivered from animal sources.

|| This is the value of the diet without canteen allowance, *viz.*: 1½ lbs. of bread to two meals a day; morning meal, vegetable soup; evening meal, plate of vegetables. Meat given on Sundays and fête days, and on Thursdays in case of long sentence prisoners. A supplement of bread of special quality is served with the soup. From the canteen he can purchase 1½ lbs. of bread daily, and a portion of potatoes, cheese, butter, milk, salad, fruits, beef. He must not buy more than 20 centimes' worth of bread nor 15 centimes' worth of the other articles, and by these allowances the diet is made ample. By the extra alone the proteids can be brought up to 170 grammes and the energy value in calories to 4,000. The French prisoner is paid for his work.

¶ The average weight of the Bengal and Behor prisoners is about 50 kilos., that of the Egyptian prisoner a little over 60 kilos. Besides these diets, there are also a number of permission diets.

** Apart from these energy values, etc., these and the other prison diets are much more varied than are the Egyptian prison diets, a matter of importance in the case of long term prisoners.

N.B.—These are the theoretical values; the actual values can only be obtained by finding out and substracting the loss from non-absorption. Hence a diet with a higher theoretical value may actually, owing to loss by non-absorption, be of much less value than one which is of lower (theoretical) caloric value.

"The food habits of a people are undoubtedly of importance in framing the diet system of any public institution; on the other hand, owing to poverty or other causes, it is quite possible that the food habits of a large section of the population may be bad. It would scarcely be justifiable to adopt such habits simply because they happened to be prevalent in the country. The eating of half-cooked lentils and beans is without doubt physiologically wasteful, while conversely the custom of eating crushed beans in the form of fried cakes is physiologically economical. I merely give these rather vague examples in order to show that the food habits of a people require careful and somewhat rigid criticism.

"The average amount of food eaten by an adult man in this country, apart from the fact that it would be difficult to arrive at with any approach to accuracy, would have a distinct interest if known. Its practical value in connection with the work of the Committee may, however, be quite easily over-rated; since sufficient information exists in various countries to show what the minimum needs of the organism are under different conditions of life. Thus I think it may be stated approximately that the minimum available energy value of the food for *subsistence* (short periods) would be 1,800 kilogramme-calories; no work 2,200 kilogramme-calories; light labour 2,800 kilogramme-calories; hard work 3,200 kilogramme-calories, with a doubtful minimum nitrogen value, for the last two, of 12 grammes.

"To take such figures as a possible basis, to employ the food-stuffs of the country where good, and to introduce foodstuffs from without, where economically advantageous, would, in my opinion, be the correct method of procedure in framing any dietary system. . . . . .

"I attach also the following Table IV, which is the result of calculations I have made based on Rubner's observations on the minimum amount of protein from different sources necessary to maintain the nitrogen equilibrium, *i.e.*, to supply the essential needs of the body in protein without the organism drawing on its internal supplies. •

"Rubner states that the minimum protein supply must be:—

Table IV.

30	grammes	if obtained from	animal sources.
34	,,	,,	rice.
38	,,	,,	potatoes.
50	,,	,,	pulse.
76	,,	,	wheaten bread.
102	,,	,,	maize (*dura*).

"It may be assumed that the same figure applies to *dura* bread or millet bread. For these figures I obtain the following co-efficients:—

Protein of animal food		$\frac{1}{1}$
,,	rice	$\frac{1}{1\cdot1}$
,,	potatoes	$\frac{1}{1\cdot26}$
,,	pulse	$\frac{1}{1\cdot66}$
,,	bread (wheaten)	$\frac{1}{2\cdot5}$
,,	maize or millet	$\frac{1}{3\cdot4}$

which can be used for reducing these food materials to what may be called their 'meat value'* as regards protein by dividing the amount of protein contained by the coefficient. It is possible by this means to get an idea of the surplus protein present in a diet over and above what may be called Rubner's minimum of thirty grammes.

"Working this out on a one-piastre basis, we obtain the results shown in Table V. The figures mean for example that in the case of maize we obtain only 28 grammes of protein capable of supplying the essential requirements of the body, in the absence of other sources of protein, while in the case of rice we obtain 53·5. Thus, whereas the protein requirements of the body could not be met from one piastre's worth of maize, a sum of rather less than six milliems would purchase enough rice to cover the *minimum* requirements, even supposing there was no other source of nitrogen in the diet (the minimum requirement is of course the absolute physiological minimum below which the body begins to consume its own tissue protein). . . .

"It is understood that the output from the quarries has much increased under the new system, and it is therefore almost certain that the amount of work done on the existing Diet No. III was very considerably less in former years for which statistics are available than it is under present conditions. . . . . . . For this reason and for the others discussed the increase in the energy value of the diet up to 3.200 calories is to be regarded as necessary.

"The conclusions arrived at are that:—

Diet No. I should have a heat value of 2,450 calories.
,, ,, II ,, ,, ,, ,, 2,750 ,,
,, ,, III ,, ,, ,, ,, 3,200 ,,

and that on these figures the mean daily amount of work should not exceed: –

On No. I, 25,000 kilogramme-metres.
,, ,, II, 60,000 ,, ,,
,, ,, III, 120,000 ,, ,,

"McCay recommends for the Indian prisoners of the United Provinces 0·21 gramme of nitrogen per kilogramme (the average weight of the men being 55 kilogrammes). The diet of the English hard-labour convict contains protein equal to 0·34 gramme of nitrogen per kilogramme (as estimated from the content of the diet in protein, the weight being assumed to average 70 kilogrammes).

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* Referred to later as the "biological value" of protein.

"If these figures be applied to the problem before us, the Egyptian prisoner having an average weight of 65 kilogrammes would receive :—

On the Chittenden scale	47·24	grammes protein daily.
„ „ McCay scale	82·7	„ „ „
„ „ English hard-labour scale ..	125	„ „ „

(the numbers being grammes of protein used in the body).

"If the various experimental diets which have been found successful, and the diets adopted in public institutions be examined, a similar discrepancy will be found to exist. The following may be quoted :—

	Protein.	Heat Value.
Siven*	39	2,444
Hirselfeld*	45	3,462
Chittenden (Fletcher)	45	1,606
Hindhede (1913)	60	3,000 (?)
Kumagawa*	54·7 (veg.)	2,640
McCay (Diet No. 11*b*) 1910 1911 ..	78·5	3,168
English hard labour	177 (gross)	4,168
British Army active service recommended (1912)	200	4,378

. . . . . . "In view of the varied opinions mentioned above, it may be of interest to consider very briefly the known facts regarding the need of protein to the animal organism, as far as these facts have a bearing on the subject in hand :—

"1. Protein is not consumed in the production of energy provided a sufficiency of carbohydrate and fat is available ; that is to say, that, given a sufficient amount of food, the loss of nitrogen is not increased by muscular exertion.

"2. Any excess of protein over and above that required for meeting the wear and tear of the tissues is used as fuel, having for the purpose about the same value as starch, or is stored up as fat or carbohydrate into which it is converted, the organism having a very slight power of storing protein as such.

"3. The experiments of Rubner and K. Thomas† have shown that the minimum amount of protein required by a man of average weight to maintain nitrogen equilibrium (*i.e.*, to live without drawing on the proteins of his own tissues) is equal daily to thirty grammes of animal protein (*e.g.*, from meat and milk), the vegetable proteins varying in value for this purpose. Thus, while thirty grammes of meat protein could be replaced by thirty-four of protein from rice, it would require no less than 102 grammes of protein from *dura* (maize). A list of the "biological values" of the protein of different food materials is given in Table I, page 54.

"The functions of the protein in the body (after growth has ceased) are various, but may be shortly stated to be the replacement of the wear and tear of the tissues and the supply of components of the secretions as far as these are not reabsorbed and used again.

"4. The nearer the intake is to the minimum the longer the organism takes to rebuild any damaged tissues or to make up for a temporary deficiency in the protein supply. . . .

"8. In addition to the low biological value, the vegetable proteins are absorbed from the human digestive tract less well than are the animal protein. This is dependent in all probability more on the structure ot of the food materials than on the nature of the protein. The more completely the food materials are disintegrated artificially the larger is the percentage absorbed. The percentage absorption of protein from various sources is given in Table I, page 54.

"The conclusions to be drawn from the above are briefly as follows.

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* Quoted from Chittenden, *op. cit.*

† From Rubner, "Die Lehre vom Kraft und Stoffwechsel" in *Handbuch der Hygiene*. Rubner, Gruber & Ficher, 1911. Also Rubner, *Wandlungen in der Volksernahrung*, 1913.

"A minimum amount of protein is required daily, over and above which a certain excess is desirable; this minimum is different for different proteins and is measured by the biological value of the protein. In determining therefore the requisite amount of protein it is essential to take into consideration the biological value of the protein components of the diet and fix the daily quantities on this basis rather than on the nitrogen content. In determining the amount of protein the defective absorption of vegetable proteins must be allowed for. . . .

SUGGESTED DIETARIES.

"If the conclusions of the theoretical portion of this Report be brought together, the following statements must form the basis of the proposed diets:—

		No. I	No. II	No. III
1.	Energy value (calories)	2,450	2,750	3,200
	Biological value of protein (grammes)	33	40	45
	Amount of available protein (grammes)	60	80	90

"It is understood that the amount of available protein (*i.e.*, the amount of protein estimated as being absorbed from the protein offered) is subsidiary to the biological value of the protein and that an excess of protein (available or in relation to the biological value given) is not excluded and would no doubt be advantageous if found possible without increasing the cost of the diet."

Fish Poisoning.

Dr. FRETZ, Presidency of St. Christopher and Nevis, in his Annual Medical Report for 1915 [p. 12] gives instances of fish poisoning:—

"Several cases of serious and even fatal illness have occurred during the year from ingestion of poisonous fish; the cases have been attributed to the well known 'Barracouda.' These belong to the genus known as the 'Sphyraena.' They are large, voracious fish possessing poisonous properties caused by their feeding on smaller poisonous fish. There is no hard and fast rule by which poisonous fish can be distinguished from edible fish; the most dangerous are those living among coral reefs, and particularly those which are bright coloured. The poisonous properties are due not so much to the fish itself as to the fact that it has eaten decomposing food."

Dr. Edmund BRANCH, Medical Officer of the Cunningham Hospital, affords testimony in this Report [p. 13] on the same subject:-

"Fish poisoning.—In the month of March a large Barracouta was caught and eaten by over a dozen people, all of whom suffered from fish-poisoning. There were some cases treated outside and a few of them died, while in the Hospital seven of them were treated with one death. I have seen cases of fish-poisoning following the eating of the Barracouta, Cavalli, and Gruper, and I have been well informed that the "yellow bill" sprat is always poisonous."

The following is an extract [p. 3] from the Report by Dr. J. G. McNAUGHTON in the Medical Service of the Gilbert and Ellice Islands Colonies, 1915–16:—

"There are several fish found in the lagoon at Funafuti which cause a dangerous form of poisoning; one fish is not always poisonous as far as I can learn, it depends on where it is caught. A fish too is poisonous here and the same fish is harmless at Nukufetau or some other island. Usually ten to twenty people are affected by this fish poisoning at one time. Their symptoms are vomiting, diarrhoea, pain in the abdomen and great depression. The danger is heart failure. In one case I found the pulse 25 per minute instead of the normal 75 or 80. One has to watch the pulse and try to tempt its rate to increase with drugs. I have seen no deaths so far. If a fish is suspected one puts a silver coin in its mouth before cooking it, and if that coin is blackened it is not safe to eat the fish. There are two fish here which may be poisonous and if that plan is used, one is quite safe."

WATER.

Sierra Leone.

Some interesting items as to water supply for Europeans in the Tropics are obtainable from the enclosures to a dispatch to the Secretary of State for the Colonies from the Governor, Sierra Leone, in 1915. This embodies a report written by a Committee appointed to consider the relative advantages of supplies derived from protected catchment areas, wells, and rain-water collected in tanks below and above ground.

In regard to wells, the Committee consider that these " cannot be regarded as a satisfactory source of drinking water supply for Europeans in this country, as water so obtained can rarely be as free from the risk of contamination as that obtained from tanks. Moreover the cost of well-sinking is an unknown factor, and, whether cheaper or otherwise, depends on the quantity of water required and luck in location." As to rivers, they hold that as " even grossly contaminated water can be purified and rendered potable," such sources of supply should not be excluded. The question of deriving supplies from protected catchment areas or springs, does not seem to have been considered.

In regard to rain-water, the Committee exclude tanks below ground as having solely the merit of retaining the water cool, and involving extra cost for lifting for utilization. The preference of the Committee for rain-water storage above ground is then stated, and they proceed to discuss the structure of suitable tanks and their accessories. They advise the type tank to be of $\frac{3}{8}$ inch steel plate 16′ × 12′ × 8′, or a capacity of 9,000 gallons. This will rest on dwarf walls raised 2 feet above the level of the ground. The top is to consist of 4 inches reinforced concrete " fitted with mosquito-proofed inlet manhole and overflow of approved pattern. Each compartment shall be fitted with a discharge tap of approved type which can be securely locked, if desired, by a special key." The cost of each such tanks erected at Freetown is estimated at £254 and Batkanu at £372.

The instructions issued to the Committee permit the discussion of sources of supply other than above defined and, accordingly, they referred to the Government of Nigeria for a statement as to working expenses of water condensers in use there. The Principal Medical Officer, Dr. F. MANNING, considers that their use is of marked utility, as " most medical men of West African experience will agree that the average man will *order* his servant to boil his drinking water ; few will see that these instructions are carried out by the not always trustworthy servant." Mr. E. Lloyd WILLIAMS, Acting Director of Public Works, Northern Provinces, adds to this communication a copy of an indent intended to supply an average station of ten Europeans with five gallons each of condensed water per day. The total cost (delivered in England) is £83 6*s.* 8*d.* Where wood and labour are cheap, it is estimated that the upkeep per annum would be, for labour and fuel £18.

Remarks.—The Governor of Sierra Leone in reviewing the Committee's Report holds that it is a mistake to exclude wells and that " where good, potable water can be obtained at a moderate depth—15 to 20 feet—I think it would be a mistake to exclude wells altogether ; the method should not be ignored, and when wells are not practicable stills or steel tanks should be trusted to." The writer suggests that this is the practical view of the matter, and that unless subsoil water is chemically of a non-potable quality, there can rarely be reason for using either rain-water tanks or stills. There can be no reason why a subsoil water supply should be more open to suspicion in the Tropics than elsewhere. That shallow well water has earned sanitarily a bad name is usually due not to faults of the subsoil but to the people who live on it. Necessarily, the locality selected for a well should be free from suspicion of contamination, and correct structure and method of protection should be pursued. In areas likely to be ordinarily selected for residence of Europeans these requirements should present no difficulty, provided conservancy for both master and man be correctly conducted. Indeed it would seem for financial, sanitary and engineering reasons right to lay down no ruling for a large area of country, but to require that the facilities for all recognized methods of water supply be the subject of enquiry in each locality concerned, and the particular method best adapted to it be employed.

Protozoa and Biological Purification.

Dr. GROENEWEGE in a recent paper* records experiments which go to show that protozoa, such as paramoecia and amoebae, considerably hasten the disappearance of bacteria in septic tanks and similar arrangements for the purification of water. Loopfuls of a culture containing amoebae and other similar protozoa were added to measured quantities of peptone-water containing cholera and other bacilli, and after a given interval the number of bacilli remaining alive were found by planting out in the usual manner. The general result was that the presence of protozoa was favourable to the disappearance of the bacilli. Specialists should consult this paper in the original, as it is too full of tabulated matter for a convenient summary.†

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*GROENEWEGE (J.). De beteekenis der protozoën voor de biologische reiniging.—*Geneesk. Tijdschr. v. Nederl-Indië,* 1917. Vol. 57. No 2. pp. 211–230.

†Summarised by Dr. J. B. NIAS.

SANITARY ORGANIZATION.

MORTALITY RATES OF BRITISH TROOPS IN INDIA.

In Section II of the Annual Report for 1915 of the Sanitary Commissioner with the Government of India [the portion contributed by the Director, Medical Services, India] is a table (pp. 39-40) showing mortality from all causes of British troops in India, from 1880 to the close of 1915. It need hardly be said that it discloses a remarkable saving of life and, as this must be reasonably ascribed in chief part to advance of sanitary measures, it affords an illustration of effort of which the medical profession may well be proud. It is not proposed to quote the figures year by year as given in the table: it suffices to state these in periods that will illustrate results:

Years.	Rate per mille.	Years.	Rate per mille.
1880	24·85	1911	4·89
1890	13·84	1912	4·62
1900	14·62	1913	3·26
1910	4·66	1914	4·32
		1915	5·95

The mortality of 1880 (24·85) therefore presents an enormous contrast to that found in 1913 before the war (3·26). But the latter rate becomes more striking if it be placed side by side with that declared by the "Royal Commission appointed to enquire into the sanitary state of the Army in India" (1863). That Commission, to which the first awakening of the "sanitary conscience" of the Government of India was due, declared that between 1825 and 1856 the death-rate of British troops was 69 per mille. The constantly sick rate was "84 per mille representing a hospital with 5,880 beds for a strength of 70,000 troops, and a loss yearly of 4,830 men or nearly four regiments. . . . The fever ague, remittent and continued, killed 17 men in 1,000, dysentery and liver diseases 20, cholera and diarrhoea 18."

PROGRESS IN KHARTOUM.

It must ordinarily be held in the present day that the *non possumus* attitude of a Civil administration in respect to sanitary advance is the outcome of its financial—not its sanitary conscience. The task of the sanitarian is either to abide the time that is promised to all who wait, or start a missionary effort that will create, or strengthen, an existing "sanitary conscience." The Medical Officer of Health of Khartoum, in his Report for 1916, having afforded medical details as to certain diseases, appends to each a serviceable moral to this end. After describing careful efforts to trace "carriers" in a small cerebro-spinal fever epidemic in the hut barracks of Egyptian troops, he states: "Personally I think there can be no doubt that the disease spread in their *hanimat* owing to the very bad ventilation of their huts and this would be, and could be, easily improved; generations of Senior

Medical Officers have called attention to this condition." Of 72 cases treated for dysentery in all " or, in practically all, cases amoebae or cysts were demonstrated microscopically." Attempts are being made both in Civil and Military practice not to discharge or give up treatment until patients are free from amoebae or cysts. He " feels convinced it will repay handsomely if this ' counsel of perfection,' as it has been described, is honestly attempted in all cases." Under typhoid fever, it is stated :—

> " The civil and military medical authorities in Khartoum and Omdurman have agreed not to discharge cases from hospital until negative bacteriological reports have been received, and there can be no doubt the extra labour involved will amply repay in preventing a carrier getting out who, with our present conservancy system, would be a dangerous menace to the general community." [p. 18.]

In regard to venereal diseases, he writes :—

> " This subject has not before been dealt with in previous reports, though the prevalence of these diseases and methods for prevention have frequently been laid before the authorities, and it is with great pleasure that I record that now the authorities appear prepared to deal with the conditions which are so productive of these diseases." [p 23.]

In regard to conservancy, a sweeper village is pleaded for, on the ground that, in its absence, members of the sweeper profession will depart to agriculture where wages are better. In urging this he states :—

> " A sweeper village is most desirable, the huts only to be given to the men as long as they remain in the conservancy ; it appears highly probable that very serious labour trouble will face the Sanitary Department in the near future if there are several fruitful years, producing cheapness of food and good wages offered for agricultural labour." [p. 28]

The missionary insistence so far is addressed to the " sanitary conscience," but the following is a direct effort to influence the financial variety—" Still not a millieme is given to the Sanitary Department for Staff or equipment for Omdurman."

PROGRESS IN MAURITIUS.

The Annual Report on the Medical and Health Department of the Colony of Mauritius, for 1915, shows that in an estimated population of 375,420 the birth rate was 34·8 and the death rate was 34·8. " The births and deaths showed but a small margin of seven on the side of the deaths." An increased prevalence of malaria is recorded together with a rise in the death rate : that for 1914 being 32·5 per mille. Dr. F. J. R. Momple, the Acting Director, gives it as his opinion that " the sanitary condition of the Colony was not satisfactory during the year under report."

The Acting Chief Sanitary Officer, Dr. F. L. Keisler, gives the following estimate of sanitary circumstances of Port Louis :—

> " 720 schedules were served upon the Municipal Corporation for Nuisances, the removal of which the Municipality is responsible for under the provisions of Ordinance No. 23 of 1903, and 491 of them still remained unabated at the end of the year. Most of the nuisances were due to defective gutters, gully holes and regards, obstruction and defective condition of the bed and banks of the various streams of the town. It has already been pointed out that most of those nuisances were due to waste of water and that the present method of water distribution plays an important part in their causation.

"The unfavourable bearing of these insanitary conditions on the causation and spread of malaria needs no further comment and the matter should engage the serious attention of the Urban Authorities.

"The scavenging service was rather indifferently performed in the town. Although the principal thoroughfares received attention, the streets in the eccentric areas were neglected. . . .

"The water supply of Port Louis remains, as has already been pointed out in previous reports, unsatisfactory and exposed to pollution. No action has, as yet, been taken by the Municipal Corporation to improve matters in that direction and it is to be hoped that this all important question will soon receive the serious attention of the Municipality."*

VILLAGE SANITATION.

In India, part of the ancient system by which disputes as to castes and social problems connected with village communities was settled was by the "panchayet" or assembly of five responsible men. The members of a panchayet are greyheads who have acquired merit for trustworthiness, and have shown themselves to be deeply versed in the unwritten law of communities. Their tact and prestige are such as usually to secure complete obedience to their edicts. Theoretically, therefore, it should be possible to cause villagers to accept at their hands the assurance that sanitation as taught by the European is of advantage. To secure a full educational effort towards self government to this there has been added by optimists the opinion, that it would be well to place in their hands funds wherewith to sanitate. But villages are numerous and sanitary sins are not always scanty; hence, the "sanitary conscience" of District Boards administering sanitation in rural areas has dictated frugal distribution of funds for the purpose of putting optimistic theories to the test. At the disposal of selected village panchayats in the United Provinces (according to the Sanitary Commissioner of that Province in his Annual Report for 1916):—

"the limit of the assistance to a village Committee in a year has been fixed at Rs.50 and grants varying, according to the local demand, from Rs.400 to Rs.600 are made by Government on condition that each district board contributes a sum equal to that received from Government. Local subscriptions are also allowed but are not obligatory.

"In addition to the above the Sanitary Board allotted sums of Rs.650 in 1914–15, of Rs.1,225 in 1915–16 and of Rs. 2,075 in 1916–17. The results of the working of village *panchayats* as given in the 'Report of the committee appointed to consider the possibility of introducing an elementary system of *panchayats* in the United Provinces of Agra and Oudh' are as follows:—

"(*a*) Some of the dirtiest villages inspected had received Government grants lately.

"(*b*) In some villages party feeling and quarrelling are so bitter that no sort of combined action has been possible and the result has been a complete failure.

"(*c*) In some cases the money was not spent at all and part or all had to be refunded.

"(*d*) In others where money has been spent no permanent effect has resulted and no public desire for sanitation has been evinced. The only sentiment which has been aroused is indifference rising in some cases to aversion.

"(*e*) Where, as in Kheri, the *panchayat* was left severely alone, no sort of attempt at improvement was made until the Tahsildar intervened.

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* Colony of Mauritius. Annual Report on the Medical and Health Department for 1915. 1917. Mauritius: The Government Press. pp. 10 and 11.

"(*f*) Subscriptions have been rare and reluctant. No permanent organization has resulted. Where the drains have been made *pukka* they were never cleaned or cleared and when the grants ceased heaps of rubbish accumulated in the old favourite places.

"The resentment of zamindars at having to pay a new sanitation cess can be imagined. The tenants are aggrieved at losing part of their manure. The inference is that no sanitation is possible without proper rules and legal powers to enforce and punish.

"Persuasion and voluntary effort can have no permanent result and we see no sign of money allotments having had any real educative effect. . .

"Villagers would never take the trouble to carry out these precautions. It is apparent therefore that the money could be better spent by increasing the rural grant which is expended on permanent improvements to wells and the principal thoroughfares of the village."*

To the apposite remark by Lt.-Col. HARRISS, I.M.S., conveyed in the last quoted sentence, may be added an appeal to the fact that it is extremely unlikely a Village Committee of the character here referred to will ever excogitate measures for securing cleanly soil and cleanly water, so long as they have never seen what either means, or realized, in practice, how both can be attained. Not even the glamour of conferring in Committee on the expenditure of Rs.50 will secure that end. Sanitary education of the uneducated can best be encompassed by practical demonstration of the health and convenience resulting from sanitary works. This amounts to another way of stating Lt.-Col. HARRISS' opinion that money could be best spent "on permanent improvements."

SOME DIFFICULTIES.

The Senior Sanitary Officer, Sierra Leone, ends his Report for 1916 by the following concise statement of inhibiting factors to sanitary progress. Their removal has the merit of being attainable with practically no encroachment upon public finance, and should therefore commend itself :—

"The Sanitary Department labours under certain difficulties which from time to time rise into prominence and hamper progress. During the year under review the following were particularly noted :—

"1. Absence of good maps.

"2. Incomplete naming of streets and numbering of houses and, especially in regard to the latter, defective knowledge on the part of the people as to where they live.

"3. Divided control of public health problems between the Senior Sanitary Officer of the Medical Department and the Sanitary Engineer of the Public Works Department.

"4. Frequent unreliability of the native subordinate staff.

"5. Indefinite or undefined relationship between the Sanitary and some other Departments.

"6. Smallness of staff."

FLIES.

The Chief Sanitary Inspector, Khartoum, in his Report embodied in that of the Medical Officer of Health for 1916, gives the following results of his observations on the rate of fly development :—

"In January, I was unsuccessful in detecting eggs, although five days after the material had been set for the flies; small larvae about one day old were found. In the middle of October and in May and August, adult flies were found within seven days; about the end of November and in December and March within eight days; about the middle of March they took about nine days to breed out. In April, no definite results were obtained and in June, July and September, no experiments were carried out.

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* United Provinces of Agra and Oudh. 49th Annual Report of the Sanitary Commissioner for the Year ending 31st December, 1916. 1917. Allahabad: Government Press. pp. 24–25.

"By these experiments, I am convinced that during the months of April, May, August, September and October, provided the temperature is high enough, the house fly does hatch out in less than seven days and in colder months the time may extend to nine days or more."*

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* Khartoum. Annual Report of the Medical Officer of Health and Report by the Chief Sanitary Inspector for the Year ending 30th September, 1916. MS.

SANITARY RULINGS.

Slaughter House Regulations.

The following Regulation is in force in Cape Town* :—

(Promulgated under Government Notice No. 244 of 1916 on the 4th August, 1916).

"(*a*) No carcases (other than game) or meat of animals slaughtered outside the Municipality, and intended for sale as food within the Municipality, shall be brought to any place within the Municipality (other than a place of examination) until such carcases or meat have been examined by an authorised official of the Council, and stamped and passed by such official as being sound, free from disease, wholesome and fit for food purposes.

"(*b*) A place of examination shall be :—

"(1) The Municipal slaughterhouse.

"(2) A depot or depots provided by the Council for the purpose.

"(3) In the case of carcases or meat consigned by rail or by sea, such suitable place as may be agreed upon by the Council with the consignees, or failing agreement, the place of discharge from the railway or ship.

"(*c*) For the examination and stamping of carcases or butchers' meat so brought into the Municipality, the Council shall have the power to make the following charges :—

"For each ox carcass or part thereof	9*d.*
For each sheep carcass or part thereof	2*d.*
For each pig carcass or part thereof	6*d.*
For each calf carcass or part thereof	6*d.*

"(*d*) Any person who shall bring, or cause to be brought, into the Municipality any carcases or meat contrary to the provisions of this regulation shall be guilty of an offence and liable, on conviction, to a fine of not exceeding £20 sterling.

"No person shall deposit, keep, prepare or expose for sale, or cause or suffer to be deposited, kept, prepared or exposed for sale within the City of Capetown, any sides or quarters of beef or any carcases of veal, mutton, goat flesh, or pork, unless such carcases, sides or quarters, as the case may be, have previously been stamped and passed by an authorised official of the Council, as provided for by regulation as being sound, free from disease, wholesome and fit for food purposes; provided that this regulation shall not apply to carcases of meat (or portion thereof) brought into the City for export oversea, or for the supply of meat to the shipping, and which do not come within the purview of the Council."

The taxing of food articles is generally poor eugenic policy ; yet, in this case, the charge for stamping is so small in comparison with the possible price of whole animals that it cannot be suggested it can have any material influence in adding to the dealers' prices.

It is probably, in actual practice, a better arrangement to make a charge for admission to a slaughterhouse of each animal passed for health and allow the stamp on the meat to be used or withheld, as the qualified examiner may think fit. Financially, notwithstanding the small charge, the sums obtainable in Cape Town under this system are not negligible ; the cattle and calves slaughtered in an eight month period amounted to 12,155 and the sheep and lambs to 110,662.

Protection of Bread.

The following useful legal ruling is in force in Butte, Mont., U.S.A. (U.S. Public Health Reports, 1916, August 11, p. 2178) :—

"Section 1. It shall be unlawful for any person, firm, or corporation, or for his agent or servant, to sell, exchange, or deliver, or offer for sale, or exchange or deliver or cause or permit to be sold, exchanged, or delivered in the city of Butte any bread unless the same shall be closely wrapped and sealed in a clean paper, each loaf to be wrapped separately, said paper to be impervious to any pollution whatsoever from dust, dirt, flies, or any vermin, and from the hands of any person or persons engaged in its sale, said wrappings to be done at the plant or shop where said product is made: *Provided, however,* that the provisions of this ordinance shall not apply to hotels, restaurants, boarding houses, or other places where bread is made for their own use.

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* The Corporation of the City of Capetown. Annual Report of the Medical Officer of Health for the Year ended 30th June, 1916. p. 34.

"Sec. 2. The use of newspapers or any other waste paper for such wrapping is strictly prohibited. All bread must stand after it leaves such ovens two hours before it is wrapped and sealed in said paper.

"Sec. 3. Each and every person, company, or corporation violating any of the provisions of this ordinance shall, upon conviction, be fined in a sum not less than $10 nor more than $300."

PREVENTION OF ANKYLOSTOMIASIS.

As part of an anti-ankylostomiasis campaign, the following legislation has been introduced into Seychelles. The clauses dealing with direct sanitary requirements are selected for quotation* :—

"3. (1) Every house and all premises or part thereof occupied as a separate habitation or occupied only by day by persons therein employed, shall be provided with a latrine or latrines duly constructed, ventilated and maintained to the satisfaction of the Sanitary Authority, or any person deputed by them.

"Provided that, with the approval of the Chief Medical Officer, or any Assistant Medical Officer, or any Visiting Magistrate, it shall be lawful to have one latrine for not more than 12 persons working or living on the same estate or property irrespective of the number of houses on such estate or property. . . .

"4. It shall not be lawful for any person to deposit or throw or to cause or allow to be deposited or thrown any human excreta elsewhere than into a latrine which conforms with section 3 of this Ordinance.

"All persons contravening the provisions of this section shall be liable on conviction to a fine not exceeding Rs.25.

"5. (1) It shall not be lawful for any person to erect or use or cause to be erected or used any latrine within a distance of fifty feet from any river or stream except with the written authority of the Chief Medical Officer, or of the Medical Officer in charge of the district where the latrine is to be erected, or of any Visiting Magistrate.

"(2) The Chief Medical Officer, or the Medical Officer in charge of the district where a latrine is erected, or any Visiting Magistrate, may, whenever he considers that, owing to the nature of the ground on which a latrine is erected, or for any other cause such latrine may, although erected at a greater distance than fifty feet from such river or stream, pollute such river or stream, order the owner of the land on which such latrine has been erected to pull down the same. . . .

"6. (1) Whenever the pit in use on any premises shall have been filled to within 18 inches of the surface of the ground, such pit shall forthwith be filled with earth by the occupier, or owner, or lessee of such premises. . . .

"(2) Before a pit shall have been filled with earth as required by subsection 1 of this section a fresh latrine shall be provided by the owner or lessee of such premises which shall be erected and maintained in accordance with the provisions of Section 3 of this Ordinance. . . .

"7. The occupier of any house, premises or estate shall keep any latrine in or on such house, premises or estate in a sanitary condition and empty any bucket-latrine in or on any such house, premises or estate at least three times in each week. . . .

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* Seychelles. No. 9 of 1917. Prevention of Ankylostomiasis in Seychelles. Victoria: Seychelles Government Printing Office. 3 pp.

"Any occupier contravening any of the provisions of this section shall be liable on conviction to a fine not exceeding Rs.25 for the first and not exceeding Rs.50 for any subsequent offence. . . .

"8. The Sanitary Authority, or any person deputed by them, may lawfully inspect any latrine or place used as a latrine and any person opposing, molesting or hindering such Sanitary Authority, or any person deputed by them, in the performance of such duty or refusing them entry upon their premises for the purpose of inspecting any latrine or place used as a latrine shall be liable on conviction to a fine not exceeding Rs.200."

TIMELY LEGISLATION.

In the Annual Report on the Colony and Protectorate of Sierra Leone for 1916, the Acting Senior Sanitary Officer (Dr. F. J. A. BERINGER) draws attention to inhibition of sanitary improvements owing to the operation of leases, and unrestrained irregular building. He states :—

"It is necessary to deal with the problems of town planning in the immediate neighbourhood of new Railway Stations; towns are still very small or non-existent; without an adequate scheme of control insanitary conditions will arise as they have arisen elsewhere in West and East Africa where the growth of towns is rapid."

A *laissez faire* policy in dealing with the question referred to by the Senior Sanitary Officer is not only likely to be detrimental to public health, but also very markedly so to the public purse; public bodies are apt to find that early legislation is considerably less expensive than tardy litigation.

SANITARY WORKS.

AN ECONOMICAL TYPE OF WATER-SUPPLY SYSTEM.

"Indian Engineering" (Calcutta) of September 8th, 1917, describes the new water supply of Muttra, which has interesting features more frequently met with in America or continental practice than in that of British engineers :—

"The Muttra water-works are the first of the kind to be completed in the United Provinces. They consist of four tube wells situated about 400 feet apart and forming a square. In the centre of this square there is a central sump 20 feet diameter and 42 feet deep forming part of the power house. This central sump is connected by means of underground tunnels to each of the four tube wells. Electric pumps and motors capable of pumping 1,000 gallons of water a minute are installed in this central sump and draw the water from the wells through suction pipes placed in the suction tunnels. The motors get their current from generators driven by Mirless Diesel engines of 100 h.p. each. The water is pumped at the rate of 1,000 gallons per minute into two balancing tanks of 100,000 gallons each placed 112 feet above the pumps, and distribution mains carry the water from these tanks throughout the city of Muttra. There are no filters, and the whole scheme is simple in working, the pumps drawing pure spring water direct from springs 200 feet below ground level, and delivering the same to the consumers. The great advantage of water-works like that installed at Muttra is that they are low in initial and yearly recurring cost and well within the means of municipalities which could not for financial reasons think of a project on the old lines of two pumping stations and costly settling tanks and filters. This very interesting and successful project was designed by Mr. C. H. West, Sanitary Engineer to the Government of the United Provinces, under the direction of the late Chief Engineer, Mr. W. G. Wood, C.S.I." [p. 132.]

THE INFILTRATION HEAD.

To find a point at which the greatest yield of a well in a sandy stratum can be secured without seriously disturbing the sand, is at times a problem that demands from the engineer considerable experimentation and observation. How vastly the yield may differ with head allowed during pumping is well seen in figures supplied by the "Indian and Eastern Engineer" (Calcutta) of August 1917 as to test of a well at Lahore :—

Infiltration head.	Yield in gallons per hour.	
	Without tube well.	With Ashford tube well 80 ft. 7 in.
7 feet	4,236	14,956
6 „	3,530	13,382
5 „	2,733	9,313
4 „	1,970	7,121
3 „	1,227	4,985*
2 „	568	3,063
1 „	not tested.	1,130

"A greater infiltration head would have given a corresponding increase in water from the tube, but it would have entailed plugging the bottom of the masonry well, contrary to the wish of the Municipal Engineer.

"It has been established that the rate of water yield in these tube wells is proportionate to the infiltration head, and heads up to 22 feet have been applied to them without causing damage or undue incursion of sand.

"The amount of water these wells will yield is remarkable. The discharge from one well at Amritsar has been measured and found to give 58,032 gallons per hour. Such a volume of water obtainable from one well entirely changes the outlook on the water problems of India." [p. 44.]

SURPLUS IRRIGATION WATER.

The usual tendency for the tropical farmer bent on irrigation is to assume he should get all and more water on his land than he pays for, with the result of securing a rise of subsoil water, pools and malaria. To lower the subsoil water table under these circumstances, and to save water of canals for extension of irrigation in areas not yet reached implies benefit to soil for agriculture and rendering, by disappearance of pools, a water-logged area less fit for breeding of anophelines. The following is a description of such a system in the neighbourhood of Amritsar* :—

"The area has hitherto been watered by a branch of the canal, but as the subsoil water level has risen to a height which threatens to put land out of cultivation, and incidentally renders the area unhealthy near the city of Amritsar, it was decided to displace canal irrigation by pump irrigation. The scheme in its entirety will consist of about forty tube well pumping stations, all worked from the Central Power Station. Each of these wells was expected to yield one and a half cusecs, yet some of those installed, we are informed, actually give as much as two and a half cusecs of water.

"The Power House is equipped with three generators of 175 kilowatts capacity, made by the Lancashire Dynamo and Motor Company. Alternating current of 50 periods 3-phase is directly generated at 6,600 volts, and it is so transmitted to sub-stations, where it is stepped down in Berry's patent oil cooled transformers, made by the British Electric Transformer Company, to 550 volts for use at the pump station, six of which are served by each sub station. Each generator is driven by a quadruple set horizontal turbines made by Messrs. Gilbert Gilkes and Co., of Kendal. . . . The distribution lines are carried on lattice towers 30 feet high, which are bound round with barbed wire at a height of twelve feet from the ground. At situations where the wires cross a railway or road, wire protection nets are spread. All the poles are united with an earth wire, and occasional poles are more completely earthed by a connection to a length of pipe driven into the ground to below water level, which was considered desirable as the bases of the poles are bedded in foundations of concrete. . . .

"The pump stations are very small in size occupying an area of 12 ft. by 10 ft. The wells consist, in the majority of cases, of a length of 120 ft. of Ashford's patent tube well strainer 10 inch diameter sunk in the bottom of a masonry stemming 4 ft. 6 in. diameter."

TIDAL CONTROL, BATHURST.

The Medical and Sanitary Report for 1915 for Gambia, describes [p. 18] the method employed for facilitating drainage under tidal conditions at Bathurst, as follows :—

"At the Box Bar outlet the sluice gates have been renewed and improved. The introduction of lengths of iron piping, passed underneath the sluice gates, from the drain to well below high water level on the beach (and closable at the outer end, when submerged, by an old iron cannon ball) has proved very successful in permitting the outflow of storm-water from the drains for a longer period between the tides than was hitherto possible. It has also decreased the amount of labour previously required to clear away the sand which banks up outside the sluice gate.

"The arrangement is in force at the outlets of the Picton Street and Blucher Street drains on the beach in Wellington Street, and it is undoubtedly due to this system, as well as to the lesser concentration of the rain in August, that Bathurst was under water to a less extent and for a shorter time this year than in 1914.

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* Indian and Eastern Engineering, 1917. Aug. pp. 44–46.

"Such a measure, however, although valuable, can only be regarded as palliative, and a careful re-grading and re-arrangement of the drainage system of the town is necessary."

SANITARY WORKS AND FINANCE.

In the "seventies" the creed held by teachers of sanitation was that the functions of the sanitarian, of the engineer, and of the sanctioning authorities could be so clearly defined that there should be no possibility of overlapping. This remains true but, with time, the functions of both sanitarian and engineer have expanded and, more especially in the tropics, are increasingly in touch. The sanitarian no longer discovers that a sewerage system works badly and therefore should be remedied at the hands of the engineer, nor waits until an engineer suggests a new water-supply system; but finds that such and such conditions fail to meet sanitary requirements, and suggests the character of sanitary engineering methods by which this end can be effected. This demands from him a sufficient knowledge of sanitary engineering to meet the sanitary engineer on his own ground, and discuss technicalities with the effect of securing *sanitary* soundness of schemes. The engineer of a class enabling him to affix the term "sanitary" to his professional description no longer can confine himself to estimates and construction, but must be prepared to place the whole of his contemplated action before the sanitarian, to be able to prove that these meet the requirements of sanitary science or, in the alternative, that the methods proposed by the sanitarian do not do so. Courtesy, necessarily, in such discussions prevents the sanitarian questioning technical details affecting stability and strength of material, unless sanitary ends are imperilled.

In short, to meet sanitary requirements the voice of the sanitarian should be paramount as to the suitability of a scheme for sanitary purposes, whilst the prime responsiblity for design and entire responsibility for construction details must rest with the engineer. But before arrival at a decision, it rests with both, in free consultation, to modify or alter their suggestions in respect to finance (over which neither are masters) in order to advise the sanctioning authority. It is then with detailed or approximate estimates before them that mutual knowledge within limits by the engineer as to sanitation, and by the sanitarian equally within limits as to engineering details, is best used to public advantage. New schemes and new methods of perfecting them can then be evolved within financial possibilities, without the sanitarian neglecting his function of advising the sanctioning authority that expenditure on an engineering scheme under the auspices of hygiene, however sound it may be in its engineering aspect, which fails to secure the sanitary ends in view, represents mere waste of public money.

The writer's remarks are *apropos* of a paper read before the Public Health Officials Section of the American Public Health Association, Jacksonville, in 1914, of which a reprint has lately been issued. The officers named in the footnote* had before them the large general question of "sewage disposal in industrial and rural communities and suggestions for its improvement."

*** Captain J. F. SILER, Medical Corps, U.S. Army, Passed Assistant Surgeon P. E. GARRISON, U.S. Navy, and W. J. MACNEAL, Assistant Director of Laboratories, N.Y. Post-Graduate Medical School, New York.**

Although they enter into practical details of methods, they do not proceed to pronounce dogmatically that here a certain form of latrine be made or there the water carriage system be adopted. After dealing with methods, they go to the root of the matter in ascertaining whence the funds could be derived, and how far the communities concerned could afford them. In short, they have followed obvious lines of evolution of sanitary works in incompletely advanced areas, such as are largely found in the tropics. In such areas, the sanitarian should be acquainted with the financial condition of the public body he serves, and, whilst never forgetting his position as solely that of adviser, he should be able to point out to the sanctioning authority methods of acquiring funds and of allotting those required in sanitary interests.* Into details of sanitary methods advised by the authors of the paper it is unnecessary to enter, but their adherence to the principles suggested above the following quotations suffice to show† :—

"The main objects of this paper are to review briefly the usual methods of disposal of human excreta observed by this Commission‡ in the South, more particularly those in use in industrial communities; to discuss in detail actual improvements in methods of disposal which have been made in certain industrial communities, the amount of money invested in such improvements and maintenance charges for same; to outline the amount of capital required to put in modern sanitary improvements; and, finally, to consider the returns which may be expected on such investments, not only from the standpoint of improvements in the general health and efficiency of the community, but also the net income in money which may be earned. . . .

"Mr. J. E. Sirrine, an engineer of Greenville, S.C., has furnished us estimates based on actual construction. . . . Using these estimates as a standard, we find that a complete sanitary system for a village of average size with 150 installations, including sewage disposal system with septic tank, complete water system supplying water for domestic and for flushing purposes, water tank of 50,000 gallons capacity and driven wells with pump and motor to operate same, would cost approximately $34,677. Interest on this amount at 5 per cent. amounts to $1,733. It may conservatively be estimated that at least 135 of the tenements in such a village would be occupied at all times. Based on a charge of $1·50 per month per house for sanitary conveniences, the income would be $2,430. After deducting the interest charges on the original investment, about $700 still remains to cover maintenance charges and upkeep. This amount would be amply sufficient provided pumping charges were reasonably low."

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* This is no mere theory. In the Madras Presidency, the Budget allotments for sanitation from all municipalities and Local Fund Board, pass through the hands of the Sanitary Commissioner, who places his remarks before the Government—the final sanctioning authority. Further these Bodies before framing their Budgets are required to give the Medical and Sanitary Officers of the Districts concerned the opportunity of making their suggestions, in the light of available resources.

† SILER (J. F.). A Study of Methods of Sewage Disposal in Industrial and Rural Communities and Suggestions for their Improvement.—Reprinted from *American Journal of Public Health.* Vol. 5. No. 9. pp. 820, 830, 831 & 832.

‡ From the Robt. M. Thompson Pellagra Commission of the New York Post-Graduate Medical School.

LANDS AND BUILDINGS.

TEMPORARY PLAGUE HOSPITALS.

It must occur at intervals that the sanitarian in the tropics finds that he requires hastily and inexpensively the building of a temporary hospital for plague, or other infectious disease. This may range in structure from mere pent-roof shelters (like magnified *tente-abri*) of thatch or bamboo matting to an imitation, in temporary material, of wards. The following specification of such a temporary hospital with the annexed plan of the chief buildings may therefore prove of utility. These were issued by the Sanitary Commissioner for Madras (W. G. KING) in consultation with the Assistant Sanitary Engineer (H. NOUROJI) in 1898, and were embodied in the Presidency of Madras Regulations of that period :—

Notes and specification to accompany standard design for a caste plague hospital.

General.

Basement walls.—These, wherever shown, are not intended to support the superstructure. They are merely for retaining the earth filling in the basement and are therefore only 9 inches in thickness. The basement walls should be built *after* the posts and the framework of the roof have been placed in position.

The basement walls may be constructed of materials described below, the choice depending on the funds available :—

(1) Brickwork in chunam,* plastered over with cement, or
(2) Brickwork in clay, plastered over with cement, or
(3) Brickwork in chunam, pointed, or
(4) Brickwork in clay, pointed with chunam.

The basement walls shall be 9 inches in thickness raised 9 inches above the ground and with a foundation of 9 inches below ground.

Flooring.—The concrete floor shall be formed of 4 inches concrete plastered over with Portland cement. The concrete shall be composed of four parts of broken bricks (1 inch gauge), two parts of sand and one part of slaked chunam. The cement plastering shall be laid in a single coat of ½ inch thickness, and shall consist of 1 of cement and 2 of sand. If sufficient funds be available, concrete cement plaster should be employed as shown on the plans ; if not, gravel may be substituted, except in latrines, bath-rooms, disinfecting platform and mortuary. The gravel floor shall consist of 4 inches of gravel rammed down to as smooth a surface as possible.

Posts and Bressummer.—These may be either of casuarina or any other approved wood. The posts shall be fixed at least 2 feet deep in the ground. A greater depth may be allowed if, by nature of the soil, the contractor considers it necessary. The posts shall be well tarred before being fixed in the ground, and the tarring shall be carried to a height of 2 feet above floor level.

The position of the posts is clearly indicated on the plan.

Walling.—The walling as well as doors and windows will consist of double bamboo mats framed with bamboo reepers on bamboo runners, securely fixed to the posts. The walling shall be carried to within 1½ feet of the bressummers, the space of 1½ feet at the top being left entirely open.

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*Literally lime, but used conventionally for either lime or lime mortar—the context being the guide to meaning.

Doors and windows.—The doors and windows shall all open on the outside. The windows shall be hinged on the top and bamboo struts shall be provided to keep them open. The struts shall be secured to the walling by a sufficiently long rope. The hinges of the doors and windows shall be of strong coir rope. All windows will be 3 feet by 2 feet, the longer dimension being placed horizontally.

The doors of the wards, hospital assistants' quarters, nurses' quarters and the mortuary will be 3 feet by 6½ feet. All other doors will be 3 feet by 6 feet.

Roofing.—The manner of trussing the various roofs is shown on the plan. But the contractor will be allowed to modify the arrangement with the consent of the supervising officer according to circumstances. The roofing will consist of single bamboo matting and over that paddy straw or hill grass supported by, and firmly secured to, bamboo rafters and reepers. In thatching the material employed should so overlap and be of a thickness that will render the roof water-tight.

The roof shall have a slope of 2 to 1, or in other words, the rise of the roof shall be equal to half the span. The verandah roof shall have the same slope as the main roof.

Wards.—The wards are two in number, one for males and one for females. The male ward measures (available space) 120 feet by 16 feet, and the female ward 96 feet by 16 feet. They are intended to accommodate 10 and 8 patients, respectively, with a wall space of 12 feet and a superficial area of 12 feet by 16 feet = 192 square feet for each bed. The number of square feet allowed over the standard of 144 square feet laid down in paragraph 3 of hints is due to the necessity where a single row of beds is used to allow additional space for relatives and nursing staff, etc. The wards have a verandah 5 feet wide running all along on one side. The communication between the wards and the verandahs will be by as many doors, each 3 feet by 6½ feet as there are beds in the wards, so as to secure the advantage of the protection afforded by the verandah, the beds of the patients should be placed on this side at a distance of 2 feet from the wall. On the opposite side of the ward there will be two windows 3 feet by 2 feet, one on each side of the bed. There will thus be two windows between each two beds. The doors and windows are so arranged, because of the necessity that may arise for cutting off any bed or beds from the others. The arrangement of doors and windows shown will allow of this being done, without interfering with ventilation or easy ingress and egress. The height of wards from the floor to the bressummer is 12 feet.

The wards will have a basement wall all round as described [above]. The flooring will consist of concrete plastered over with Portland cement, or if economy is essential, the floor may be formed of gravel as described before. If a concrete floor is laid, it should have a fall of 1 in 100 from the verandah side to the opposite to facilitate the cleansing of the floor. Each ward will have a detached latrine and bathroom as shown on plan, and there will be a common cook-room, measuring 20 feet by 8 feet for the patients. When intended for the accommodation of "gosha" women, each ward should be surrounded by bamboo or cadjan matting, provided with one or more entrances by double doors. The matting should be at such distance from the ward and of such height as to present no obstruction to perflation.

Hospital assistants' quarters.—This will consist of the following :—

(1) A drug-room 10 feet by 12 feet with an adjoining verandah 5 feet wide.

(2) A living room 12 feet by 12 feet with an adjoining verandah 5 feet wide and a bath-room 6 feet by 6 feet attached to the rear side.

(3) A detached cook-room.

The main block will have a basement wall as described before and a gravelled floor. The height of the rooms will be 12 feet from the floor to the bressummer. The bath and cook rooms will be as specified elsewhere.

Nurses' quarters.—These will consist of two adjoining rooms, each 12 feet by 12 feet and 12 feet high with a bath room 6 feet by 6 feet attached to each. The rooms will have a gravelled floor with a basement wall all around, pertaining to these quarters, there will be a common cook room 12 feet by 6 feet.

Quarters for Relatives of Patients.—These will consist of two blocks, each containing six rooms 10 feet by 10 feet and 11 feet high with a verandah 5 feet wide on one side. The floor will be of gravel made into a ramp 6 inches high without any basement wall. There will be a bath room and latrine, one each for males and females, and a common cook room for the use of all the inmates.

Servants' Quarters and Sweepers' Quarters.—These will consist of three blocks as shown on the plan. The blocks for servants and orderlies will have three rooms each 10 feet by 10 feet and 8 feet high. The block for sweepers will contain four rooms each 10 feet by 8 feet and 7 feet high. The floor will be of gravel made into a ramp 6 inches above ground without any basement wall. A latrine will be provided as shown on plan for the use of these people.

Mortuary.—This will be in two compartments each 10 feet by 10 feet and 10 feet high, one for male corpses and the other for female corpses. The building will have a basement wall of concrete, floor plastered over with cement. The floor will have slope of 1 in 100 towards the side on which the cesspool is situated. Along the edge of the floor there will be a low wall 3 inches high and one brick thick. The walling will be of corrugated iron sheets to a height of about 2 feet from floor and above this the usual bamboo matting.

The Disinfecting Platform.—This will be an open platform (without any tatty* walling or roof) 12 feet by 10 feet with floor formed exactly the same as that for the mortuary.

Cook rooms—These will be of the dimensions given below:—

For patients	20′ × 8′ with ten fire places.
For relatives of patients	15′ × 6′ with seven fire places.
For hospital assistants	10′ × 6′ with two fire places.
For nurses	12′ × 6′ with three fire places.

All these rooms will be 8 feet high and have a plain gravelled floor without a basement wall. The fireplaces will be formed in the usual manner in this part of the country with earthenware *adduроos* bedded in clay and placed 2 feet from centre to centre. As a protection to the tatty walling from fire, there will be a brick in clay wall 2 feet high between the fireplace and the tatties as shown on the plan.

There will be a small sink in each of the cook-rooms connected with a cesspool outside. The sinks will be formed of 4 inches concrete with a curb wall 4½ inches wide and 3 inches high, the whole plastered over with cement.

Bathrooms.—All bathrooms, whether attached or detached from the main blocks, will be 6 feet square and 7 feet high from the floor to the bressummer. They will have a basement wall with concrete floor plastered over with Portland cement. Along the edge of the floor there will be a low wall 3 inches high and one brick thick. The floor will slope in the direction of the cesspool. The bathrooms will have tatty walling.

Latrines.—The privy receptacles will consist of a 9 inches semi-oval channel formed of concrete *in situ* between two parallel masonry walls The channel will be partitioned into spaces 2½ feet wide. In each space there will be placed a galvanized iron or stoneware pan across the channel, with the edges of the pan resting on the walls of the channel. These pans will be shallower than the channel itself, so as to allow a clear passage between the two. The walls of the channel will serve as footrests. The solid excrement will be received in the pans, and the urine will be discharged into the open channel. The channel shall have a fall in the direction of the cesspool of not less than ¼ inch per every foot of its length. The building will have tatty walling and a roof as in other structures. The whole of the exposed masonry, including the channel, shall be plastered in cement as already specified.

Cesspools.—The cesspools shall measure 1½ feet by 1½ by 1½ feet inside. The floor shall be of 4 inches concrete, the walls of 9 inches thick brickwork and the whole of the interior and the top of the walls shall be plastered with cement."

---

*Bamboo or other form of screens.

NEW SITES.

According to the Medical and Sanitary Report of the Gold Coast for 1915, sanitary measures in respect to the Seccondee-Coomassie line are carefully watched. The vote for sanitary maintenance is at the rate of £5 per mile. This however, it is contended, does not suffice for the purpose and it is held that there is

> "need for better housing of native railway officials, delimitation of railway land, public conveniences at the railway stations and the more effective screening of tanks. . . . In the case of the new districts that are being opened up along the Accra-Koforidua line and its extension a prospective policy has been adopted ; sites of segregation areas outlined, possible future towns have been surveyed, and precautions taken against indiscriminate building by early settlers." [pp. 16–17.]

Dr. ALEXANDER further records considerable progress in Accra, Cape Coast, Saltpond, Winnebah, Axim, Coomassie and Koforidua, in respect to segregation areas for Europeans. He states that :—

> "In every single instance the segregation area occupies a position considerably higher than the native town and this in itself means a good deal. . . . Yellow fever is proving a powerful ally on the side of the advocates of segregation and two firms in Accra have been converted directly as the result of recent deaths from yellow fever." [p. 19.]

REINFORCED CONCRETE.

In some tropical areas, the use of iron in reinforcing concrete may be expensive. The Philippine Public Health Service however advocates methods which it is calculated admit of a cheap substitute and conduce to the use of cement concrete in house-building within the means of the labouring class. In buildings with wooden panels as usually employed in bricknogging, the use of moulds for preparing slabs and shingles and substituting strips of "woven bamboo" (bamboo mat) for iron reinforcement is advised. The Bulletin sets forth this method, in connection with a model "sanitary house," of which a plan is furnished* :—

> "*Preparation of the moulds.*—The moulds should be cleaned before being used, and oiled, or greased to avoid the cement sticking to the wood. When moulds for making shingles are prepared, two wire loops should be caught between the two pieces of the mould, the end being inserted to the middle, the upper half projecting above the surface of the mould. The points where these wire loops are to be located at the moulds are marked in the plan (second sheet of the plan).
>
> "*Preparation of materials and the method of manufacture of shingles and slabs.*—Mix well equal volumes of cement, sand, and ricehusks ; wet a quantity of this mixture sufficient to fill the moulds, stirring it continually, while water is being added. until the mortar becomes thoroughly mixed and has obtained the consistency of a moderately thick paste. To make the shingles, put in a layer half filling the mould and upon this mortar place the reënforcement of woven bamboo (shown in the plan) care being taken that it sticks to the mortar ; press down the reënforcement and mortar so that the wire loops will protrude above ; then insert small sticks of bamboo not less than two inches long in the loops so as to hold down the reënforcement. This is to keep the loops in place, upon being removed from the mould. Then the mould is completely filled with mortar the

---

* Philippine Health Service. Government of the Philippine Islands. Department of Public Instruction. Bulletin No. 16. Plans and Instructions Relative to the Construction of the Sanitary Model House. 1917. Manila : Bureau of Printing. pp. 8 & 9.

surface being smoothed by the trowel. If very smooth work is desired a little pure cement may be spread as a finishing coat. In this condition the mortar should be left to harden, taking care that it does not dry too quickly. To prevent drying too quickly the moulds should be put in a cool shaded place and covered with wet sacks. When the mortar has hardened sufficiently, twenty-four hours will suffice, the shingles should be removed from the moulds by opening them, due care being taken that the shingles do not break, and then stored in a cool place covered with wet sacks or immersed in water for at least nine days, and if possible, for twenty-eight days. After this period the shingles will be in a fit condition to use.

"After the shingles or slabs have cured as above described, they should be set on edge in the sun and wind for four or five days, with small spaces between, so as to assure equal drying on both sides, if this precaution is taken they will not warp or twist after being placed on the roof or in the walls and partitions.

"To make the slabs, a layer of the prepared mortar is placed on the mould filling one-third; on the mortar a reënforcement of woven bamboo is then placed, due care being taken that it sticks to the mortar; upon the reënforcement another layer of mortar is placed to cover two thirds of the mould; on this mortar another reënforcement of bamboo is placed, then the mould is filled with mortar and carefully trowelled, the surface of the mortar may be smoothed by spreading a little cement over it, if desired. In this condition the mortar is left to harden (36 to 48 hours) due care being taken that it does not dry too quickly, observing the same precautions taken for the shingles. When the mortar has sufficiently hardened the movable sides of the mould are removed, and the slabs handled carefully to prevent them from breaking, then they are put in a cool shaded place covered with wet sacks for at least nine days and if possible for 28 days. After this period the slabs will be in a condition to be used."

ROADS.

Roads have an influence direct and indirect upon the health of populations. If good, they facilitate traffic upon which food and prosperity may largely depend; if bad, they aid the retention on their surface of filth over large areas in towns. Hence, interest in securing good roads need not be relegated solely to the engineer; in this matter, the sanitarian should be a coadjutor. MACADAM, on whose ideas modern stone roads are chiefly formed. insisted on the principle that the broken stone should be arranged in conformity with size so as to produce a wedged mass in flat arch form, without dependence on binding material. In good modern practice, the binding material on the surface is practically *nil*. Nevertheless, if broken "road metal" is expensive, contractors are liable to depend greatly on "binding" material. In a leading article in its issue of July 22, 1916, "Indian Engineering" thus animadverts upon roads formed on this principle:—

"The presence of dirt in the metal prior to consolidation should be discouraged in every possible way. We know all about the voids, but the dirt will come soon enough. It would be most undesirable for an engineer to let his subordinates and contractors know that he would not object to 10 or 15 per cent. of dirt; he would be liable to get double this percentage, and a bad road. The best results are always obtained from clean metal, and the difficulty always is to get it sufficiently clean. The body of the metalling should be as free as possible from earth, and the superficial binding is quite another thing." [p. 50.]

The use of earth not only aids the wearing of the metal by friction, but secures that under pressure of traffic depressions for receipt of puddles and foul surface washings are rapidly formed.

In the matter of "waterproofed roads" the same journal in its issue of August 19th, 1916, states:—

"We notice that waterproofing of roads in Singapore has proved a thorough success in that city, and that it has caused a very great reduction in the cost of the maintenance of the roads of Singapore—the finest to be seen, perhaps, anywhere in the East. We notice in this connection that the President of the Singapore Municipal Commission recently gave an interesting comparison of cost regarding different kinds of roads. He observed, for instance, that the capital cost of a 4-inch laterite road was $5,632 a mile, a granite road $6,336 a mile, while a waterproofed road only cost $1,689·60 a mile." [p. 118.]

VITAL STATISTICS.

COMMONWEALTH OF AUSTRALIA.

In the Department of Trades and Customs of the Commonwealth of Australia, 1917, a Report has been issued embodying the findings of a Committee appointed to suggest measures for the mitigation of infantile mortality. Sir H. B. ALLEN, Dr. J. H. L. CUMPSTON and A. Jeffreys WOOD were members, whilst Mr. James MATHEWS, M.P., was Chairman. This embodies earnest pleading for the carrying out of more systematized measures for the protection of infant life.

The first part of the Report is devoted to a consideration of the extent and causes of infantile mortality in European countries. Happily, it was not found necessary to urge more vigorous action in Australia on the ground that these older countries, as a result of their better forethought, had secured rates which put the Colonies to shame. On the contrary, whilst Russia heads the list with an infantile mortality of 254, of 19 European countries specified only one, namely, Norway (70 per mille), gives a rate superior to any of the several territorial areas of Australia. It is the figure obtained in New Zealand which it is sought to get level with. This amounts to the splendid rate of 59 per mille.

The references to European experience in the first part of the Report centre upon the broad fact that the concomitant risks of insanitary conditions in urban life result in a greater infantile death rate than in ordinary rural life. This the Committee proved equally true of Australia, as well as the corollary that hygienic advances in urban areas have been effected at a greater rate than in rural; with the consequence that, defined by percentages, improvements can in the same periods, be shown to be greater in urban than in rural areas. Thus, of New South Wales it is stated :—

> "The rate in the metropolis has declined steadily during the last 35 years from 174 to 72, a reduction of 58 per cent., whilst the country districts have declined from 94 to 65, a reduction of only 30 per cent., which, whilst gratifying in itself, is not so marked as the metropolitan decline." [p. 9.]

A similar illustration of the fact is used as to Victoria where there has been a general decline for the whole State during the period of 1881–1914, from 126 to 78, a reduction of 38 per cent. The Metropolitan area has shown a fall from 171 to 84, or a reduction of 51 per cent. The remainder of the State has shown a fall from 95 to 74, or a reduction of 24 per cent.

When the various States of the Commonwealth are regarded, it is found that from 1871 to 1900 the rate of decline was small, namely, from 119·47 to 112·35, whilst, in the case of New Zealand, the decrease was from 106·69 to 80·03. Nevertheless, from 1900 onwards the decline in the Commonwealth rate has been marked, namely, from 99·96 of that year to 67·52 in 1915.

Having established these generalizations, the Committee proceed to ascertain how far age and sex groups exhibit influence. The conclusion is arrived at that:—

> "Whatever factors have been operating between 1891 and 1913 to produce a reduction in the infantile mortality have made their influence felt to a very small degree on infants under one month old, but have been increasingly influential in the later parts of the first year, producing the greatest reduction amongst infants between the ages of six and twelve months. Girls have apparently been more susceptible than boys to these factors making for improvement until the age of three months, after which there appears no more than a slight difference between the sexes. . . Considering first the State as a whole, it appears that the total mortality during the first month is very largely composed of a mortality during *the first week,* and that this mortality during the first month has remained stationary during the last fifteen years, while the total infantile mortality has fallen from 103 to 67." [pp. 11 & 12.]

The next effort of the Committee is to ascertain the nature of diseases causing mortality within defined periods. In the fatal first week, 16·43 per mille of births perished of congenital debility, icterus and sclerema. After the third month, diarrhoea and enteritis become dominant death factors; so that, in the 12 month period, from these causes 16·68 perished. Of the total deaths in this period the per centages were as follows:—

Convulsions	3·1	per cent.
Pneumonia group .	9·1	,, ,,
Diarrhoea and enteritis ..	24·7	,, ,,
Malformations ..	5·5	,, ,,
Congenital debility . .	37·4	,, ,,

At p. 19 of the Report, there is produced a table embracing data from 1904 to 1915 showing that "the rate under five coincides with the rate under one, rising and falling with it, and not in the next succeeding years."

The Committee express the belief that the "death rates from infantile diarrhoea, from the diphtheria of childhood, from the tuberculosis of early manhood, are higher amongst the congenitally syphilized than amongst the non-syphilitic."

Their enquiry into pre-natal causes influencing infantile mortality leads to the following conclusion:—

> "First, and especially important, is syphilis. Your Committee has dealt in a general way with this subject, but this special aspect requires to be dealt with more in detail.
>
> "Secondly, that group of known causes—including poverty and overstrain of the mother, difficult labour, toxaemias such as albuminuria of pregnancy and others—which are susceptible of considerable reduction.
>
> "Thirdly, that large group of "unknown" causes, which should be further studied." [p. 21.]

In discussing preventive measures, the Committee quote NEWSHOLME's dicta as to the influence of errors in Municipal sanitation:—

> "1. Insanitary methods of disposal of human excreta;
>
> "2. Insanitary methods of scavenging of domestic refuse;
>
> "3. Unpaved roads and back streets, and unpaved ill-drained back yards of dwellings." [p. 32.]

To these they would add a positive—"municipal supervision over food supplies, especially milk and infants' foods."

Beyond these general sanitary measures, the Committee specially advises (1) Co-ordinated efforts "against inheritable diseases, amongst which syphilis must be prominently placed."

(2) Ante-natal clinics at which expectant mothers are to be given teaching in the "necessary principles of hygiene and be afforded necessary skilled attendance and advice."

(3) The education of growing girls in the elementary knowledge of the hygiene of infant life.

(4) Visitation of mothers with young infants by expert health visitors.

INDIAN JAILS.

The following vital statistics are furnished in the Annual Reports for 1916 of the Jail Departments of the respective Provinces named :—

Province.	Daily average strength.	Death-rate per mille.	
		Tubercle of lungs.	All cases.
Assam	2,213	3·6	18·51
Central provinces and Berar	4,006	2·3	22·63
Madras	12,440	2·54	12·1
United Provinces ..	26,693	2·7	13·7
Bihar and Orissa ..	7,634	6·0	34·4
Punjab	13,702	5·4	20·32

The heavy mortality in the Bihar and Orissa Jails is largely due to tuberculosis which, according to the Local Government Review of the Report, is presumably connected with "the older and ill-ventilated wards."

The Inspector-General, holds as a further factor, that "this unsatisfactory state of affairs is due mainly to the weakening of the Medical Administration of the majority of the Jails, owing to the recall of the permanent Military Superintendents to military duty on account of the war, and the appointment in their place of officers who had little or no experience of jail medical work." The Local Government have intimated their intention of proceeding with "constructional reform of buildings."

Prisoners' Weights.

In all Indian Jails the weightments of prisoners are carefully recorded, and any falling off in weight in any individual greatly aids in drawing attention to his physical condition, in relation to prison labour and hygiene of his environment. The following figures are derived from the Annual Reports.* Side by side with weightment results are shown the death-rates per annum from "all causes." There

---

* For 1916, except that for Bengal, which is for 1915, of Jail Administration of the Provinces named.

is of course no direct connection between the two, but, under certain circumstances, there might be a relation :—

Province.	P. neither gained nor lost weight.	P. gained weight.	P. lost weight.	Death-rate per mille.
Madras	16·31	67·1	15·82	12.1
United Provinces ..	24·42	65 32	10·26	13·7
Punjab	33·3	50	16·7	20·32
Bengal	21·68	55·92	22·40	20·6
Central Provinces and Berar	22	65	12	22·63
Assam	17·7	61·7	20 5	28·59
Bihar and Orissa ..	24·03	55·29	20·7	32·8

PROVINCES OF INDIA.

The following are the births and deaths for the various provinces in India during 1916 :—*

Provinces.	Birth-rates.	Death-rates.
Madras	32·54	21·87
Punjab	45·59	30·70
Assam	30·52	28·59
Bengal	31·89	27·37
United Provinces	43·09	29·50
North-West Frontier Provinces ..	33·84	30·09
Central Provinces	43·85	39·95
Bombay	35·98	33·32
Bihar and Orissa	36·6	32·8
Burma	33·71	23·97

GOLD COAST.

The Annual Medical and Sanitary Report for the Gold Coast, for 1915, [pt. 2, p. 18] affords the following death and invaliding rates :—

European Mortality and Invaliding Rates, 1915.

Total Strength.		Deaths.	Invalidings.	Death-Rate per 1,000.	Invaliding-Rate per 1,000.
	No.				
Officials ..	700	7	21	10·00	30·00
Non-Officials	1,306	13	42	9·95	32·15
Totals ..	2,006	20	63	9·97	31·40

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* **Report on the Sanitary Administration** of Burma for the Year 1916. **1917. Rangoon** : Office of the Superintendent, Government Printing, **Burma. p. 2.**

FREETOWN.

Whilst not vouching for the accuracy of figures the Senior Sanitary Officer, Sierra Leone, in his Annual Report for 1916, refers to the appalling infantile mortality amongst natives in Freetown. The death-rate per 1,000 births is for males 364, and for females 385.

EAST AFRICA.

Excluding deaths due to accident and causes other than disease, the death-rate for Europeans in East Africa was, from 1910 to 1915, as follows : –

1910 rate per mille	14·9
1911 „ „ „	10·3
1912	8·4
1913	6·5
1914	6·2
1915	6·6

Against favourable rates of the last three years quoted has to be balanced the influence of invaliding. Excluding active service casualities, this was at the rate of 14·3 per mille.

FIJI.

The legislative council, Fiji (paper No. 22 of 1915) for 1914 gives the following vital statistics for that area :—

Age of parents.—In a total of 92 instances of births amongst the Europeans, the average age of fathers was 36·2 and of mothers 29·7.

Deaths.—40 Europeans died at the average age of, males 42·99 and females 34·35.

SEYCHELLES.

In 1916 the estimated population was 24,090, the birth-rate was 30·89 and the death-rate 16·57 per mille.

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KALA AZAR (Leishmaniasis).

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[*See also under* **Disease Heading.**]